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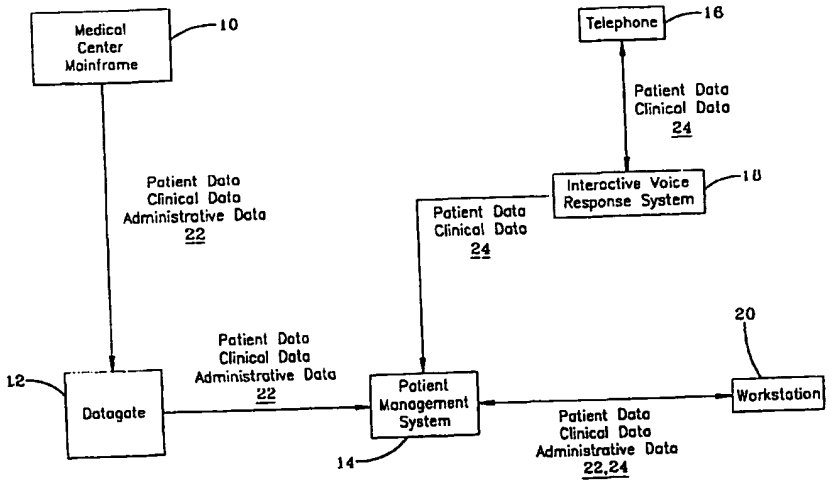
(54) Title: CHRONIC PATIENT MANAGEMENT SYSTEM



(57) Abstract: A chronic patient management system for developing a complete and comprehensive patient data record for use in managing the medical care of chronically ill patients is disclosed. The data related to the patient that may be collected and reviewed includes patient data, clinical data, and administrative data. In a preferred embodiment of the present invention, transplant related information for patients is collected, monitored, and reported. An interface component, an administrator component, a pre-transplant component, and a post-transplant component support the entry and review of data that is particularly important in managing care for transplant patients. Healthcare professionals from many different disciplines can access the patient management system and view the data in a manner that is appropriate for each person's area of expertise.

WO 01/70094 A2

CHRONIC PATIENT MANAGEMENT SYSTEM

Technical Field of the Invention

The present invention is in the field of patient management systems. Specifically, the present invention is in the field of medical information collecting, monitoring, and reporting systems for the care of patients with chronic conditions and illnesses.

Background of the Invention

Recent advances in medical technology have improved the prognosis of chronically ill patients. Many chronically ill patients today are able to receive transplanted organs that improve the quality of their lives. When a patient receives a transplanted organ, it is very important that all of his or her healthcare needs are considered. Most of the problems encountered by transplant patients occur after the patient has been discharged from the hospital, usually during the first six to 12 months after transplantation. Monitoring the patient for rejection of the transplanted organ and control of the patient's medications are important aspects of the patient's care. Many of the medications that a patient must take result in undesired side effects that also must be controlled. For example, some anti-rejection medications cause an increased risk for some kinds of cancer.

The wide-range of problems that must be addressed pre- and post-transplant require the skills of healthcare professionals in many disciplines. A patient who has a chronic illness may start by seeing his or her primary care physician. The patient may be then be referred to one or more physicians who assist in a diagnosis of the patient's illness. For example, a patient with a heart condition may visit a cardiologist and a pulmonary specialist. If the patient requires surgery, he or she may then visit one or more surgeons who will complete an evaluation of the patient and make recommendations. Following surgery, the patient may

return to the care of his primary care physician. Each healthcare professional that the individual visits records information and data about the patient in order to assist the patient in his or her healthcare needs. However, there is typically no way to consolidate this information to develop a comprehensive patient care record for use by all of the healthcare professionals involved in the patient's care.

Therefore, there is a need for a comprehensive and integrated patient management system for chronically ill patients, including transplant patients.

Summary of the Invention

The present invention is a comprehensive and integrated modular patient management system designed to manage chronically ill patients such as transplant patients. The system generates a longitudinal permanent patient record that may be used for daily patient management and for performing aggregate studies on a population. In a preferred embodiment of the present invention, transplant related information for patients is collected, monitored, and reported. The present invention, however, may be used for tracking of information related to any chronic illness or condition. The use of transplant specific information is not required. The data related to the patient that is collected and tracked may be used to develop a treatment plan for each patient and to evaluate the effectiveness of the treatment plan.

Information is tracked over a long period of time, preferably, throughout the patient's lifetime, so that a complete and comprehensive record for the patient is created and maintained. A modular design is used so that the system may be customized to meet the needs of a care provider and new features and functionality are easily added. Most importantly, modifications of source code are not required in order to tailor and customize the

system for a variety of purposes. Therefore, healthcare professionals involved in different disciplines may use the system to view data and track conditions that are relevant to their area of care. Furthermore, the same information can be viewed by different physicians in different disciplines.

An administrator component supports configuration and customization features of the system. Standard screens are provided and may be selected or deselected. In addition, screens may be configured and customized to meet the needs of individuals providing patient care as well as the facility through which patient care services are provided. Screen properties may be modified and fields may be added or deleted from screens as needed. The system may further be configured to enable or disable specific types of information (e.g., transplant information). Graphing capabilities may be manipulated by a user at runtime. Graphs may be generated from any screens added from the administrator. A user may select any laboratory item and related time period to be displayed. The ability to configure and customize screens allows viewing of patient data and all data related to the patient in formats that are best suited for each healthcare professional.

An interface component supports various interface engines so that data from various sources may be imported and integrated into the system of the present invention. The ability to import and export data allows for the development of a more complete and comprehensive patient data record. For example, patient history from a variety of sources may be imported to the system. Insurance, demographic, and other information relevant to the patient's care may also be imported. Finally, information regarding medications and other data useful in developing and evaluating a treatment plan may be imported.

A pre-transplant component provides for tracking of patients who may be eligible for transplants. A complete patient history may be developed for use in determining whether a patient is a candidate for a transplant. Data from the patient's primary care physician may be evaluated in addition to data from other healthcare professionals the patient has seen. Government regulations control many pre-transplant activities for a patient. The present invention supports the pre-transplant activities through development of a pre-transplant checklist for each patient. The checklist has checklist data that identifies the items for each patient that must be completed prior to a transplant. Finally, insurance and other information relevant to the patient's care may be used in evaluating a patient's eligibility for a transplant.

A post-transplant component allows physicians and other healthcare professionals to efficiently manage the care of patients who have received transplanted organs. A variety of forms support the collection and display of medical, demographic, insurance, and other data. Longitudinal data may be displayed on various forms so that the patient's condition over time may be evaluated. Extensive use of lookup tables provides for consistent data across screens. Unique algorithms for monitoring patient status are used so that physicians and healthcare providers are able to obtain useful and meaningful information when providing care to and managing chronically ill patients.

The present invention will be described in greater detail hereinafter. The present invention is described in the form of preferred embodiments and is not to be limited to those preferred embodiments but instead shall be given the broadest scope of protection affordable under the law in view of the allowed claims.

Brief Description of the Drawings

Fig. 1 is a schematic drawing of a preferred embodiment of the present invention;

Fig. 2 is a schematic drawing of the primary components for a preferred embodiment of the present invention;

Figs. 3-6 are sample screens for an administrator component for a preferred embodiment of the present invention;

Fig. 7 is a schematic drawing of a pre-transplant component for a preferred embodiment of the present invention;

Figs. 8-9 are sample screens for a pre-transplant referrals component for a preferred embodiment of the present invention;

Fig. 10 is a sample screen for a pre-transplant living donor component for a preferred embodiment of the present invention;

Fig. 11 is a sample screen for a pre-transplant insurance component for a preferred embodiment of the present invention;

Fig. 12 is a sample screen for a pre-transplant lab batteries component for a preferred embodiment of the present invention;

Figs. 13-16 are sample screens for a pre-transplant medical evaluations component for a preferred embodiment of the present invention;

Fig. 17 is a sample screen for a pre-transplant summary component for a preferred embodiment of the present invention;

Fig. 18 is a sample screen for a pre-transplant checklist component for a preferred embodiment of the present invention;

Fig. 19-27 are sample screens for a pre-transplant tissue typing component for a preferred embodiment of the present invention;

Fig. 28 is a schematic drawing of a post-transplant component for a preferred embodiment of the present invention;

Figs. 29-30- are sample screens for a post-transplant medications component for a preferred embodiment of the present invention;

Fig. 31-32 are sample screens for a post-transplant prednisone taper component for a preferred embodiment of the present invention;

Fig. 33 is a sample screen for a post-transplant blood pressure component for a preferred embodiment of the present invention;

Figs. 34-36 are sample screens for a post-transplant rejection episodes component for a preferred embodiment of the present invention;

Figs. 37-42 are sample screens for a post-transplant problem list component for a preferred embodiment of the present invention;

Figs. 43-44 are sample screens for post-transplant lab data analysis components for a preferred embodiment of the present invention; and

Figs. 45-46 are sample screens for a chart export component for a preferred embodiment of the present invention.

Detailed Description of Preferred Embodiment(s)

Referring to Fig. 1, a schematic drawing of a preferred embodiment of the present invention is shown. As shown in Fig. 1, the patient management system of the present invention is adapted to accept information and data from a plurality of sources so that a comprehensive and complete patient record may be developed for each chronically ill patient. Preferably, the information and data used by the patient management system is designed for operation in accordance with a client workstation 20 and a server 14 so that it may be

accessed from remote locations. The server may be a PC based computer that is equipped, preferably, with an operating system such as Windows NT Server and a database server such as Microsoft's SQL Server. Preferably, communications with the server are in accordance with the TCP/IP protocol. One or more servers may be used to provide the features and functionality of the patient management system. Information and data may be stored in one or more databases located at the server. Patient data, clinical data, and administrative data 22 may come from other healthcare information systems such as a medical center mainframe 10 used by a hospital or other major medical center. Patient data, clinical data, and administrative data may also come from information systems used in physicians' and other healthcare professionals' offices.

As shown in Fig. 2, patient data, clinical data, and administrative data 22 imported to the patient management system 14 may be transmitted through a Health Level 7 (HL7)-Datagate that supports real-time information feeds from other systems. HL7 is a standard in the healthcare domain that supports the exchange of information between information systems that conform to the standard. HL7 allows disparate healthcare applications to exchange key sets of clinical and administrative data. Information may be also be exported from the patient management system 14 to a medical center mainframe 10 or other healthcare information system using the datagate 12.

Patient data and clinical data may also be entered or recorded into the patient management system 14 using a telephone 16 and interactive voice response (IVR) system 18. The management of chronically ill patients requires frequent tests and procedures to determine changes in the patients' conditions. Many of these tests and procedures may be performed at outpatient clinics, physicians' offices, or other healthcare facilities. Clinical

data 24 related to these tests and procedures may be entered or recorded in the patient management system 14 remotely through a telephone 16 and IVR system 18. The patient may call the IVR 18 and be prompted for patient data as well as clinical data for the latest test or procedure. For example, data related to a patient's blood pressure, urinalysis, culture, etc. may be entered or recorded. The convenience of using the telephone to enter data increases the likelihood that the healthcare professionals monitoring the patient's condition will have the most current data available.

Healthcare professionals may access all of the available information and data for a patient, including patient data, clinical data, and administrative data, using a workstation 20 in communication with the patient management system server 14. Preferably, the workstation is equipped with an operating system such as Windows 95/98/NT, a network interface card (NIC), and a database interface such as Microsoft's ODBC. Preferably, communications with the server 14 are accomplished in accordance with TCP/IP. Because the workstation 20 and server 14 are adapted for TCP/IP communications, the patient management system may be accessed via the Internet. In addition to viewing and evaluating the available data, the healthcare professional may enter additional information and data through the workstation. Workstations for accessing the patient management system may be located at physicians' offices, hospitals, medical centers, and other healthcare facilities. Therefore, all of the healthcare professionals involved in a patient's care including a primary care physician, surgeon, nurse, and other clinicians may access the same data. The customization features of the present invention allow each clinician to develop views of the data that are most appropriate for his or her field of expertise.

The patient management system of the present invention supports the collection, monitoring, and reporting of patient data, clinical data, and administrative data 22. Patient data may include identifying data for a patient (e.g., name, address, social security number, patient number), demographic data (e.g., age, sex, employment history, family history, next of kin, etc.), and complete medical history data (e.g., allergies, medications, adverse events, physicians, date of transplant, transplant physician, transplant coordinator, number and type of transplanted organs, etc.). Clinical data includes data related to the patient's condition and may include lab and test data, biopsy data, physical examination data, etc. Administrative data may include insurance data and other data as may be required to cover all aspects of a patient's care.

Fig. 2 is a schematic drawing of the primary components for a preferred embodiment of the present invention. As shown in Fig. 2, the primary components of the present invention are adapted for transmission of information and data to and from the database(s) of the patient management system 38. The information and data in the patient management system databases support the development of a comprehensive and complete patient record for chronically ill patients.

The interface component 40 supports the transfer of imported and exported data 40. As described above, patient data, clinical data, and administrative data from other healthcare information systems such as medical center mainframes or healthcare offices may be imported to the patient management system databases 38 using a HL7-Datagate or other system that supports HL7. The transmission of data may be bi-directional so that information and data may be exported from the patient management system databases 38 to other healthcare information systems.

The administrator 36 preferably comprises a graphical user interface that supports configuration of the system for the specific needs of the user. The elements of the system that may be configured include the menu system, application name, and screens for viewing data. In addition, the use of transplant specific information is optional, as is the use of standard screens. In a preferred embodiment of the present invention as described herein, transplant specific is used. Preferably, a plurality of lookup tables 48 are used to support the features and functionality of the present invention. New lookup tables 48 are easily integrated in to the system because the administrator 36 automatically detects them. The extensive use of lookup tables rather than free text provides consistency in the use of terminology across screens. New lookup tables and new screen definitions may be developed without any modifications to source code. The ability to create new lookup table and screen definitions allows the patient management system to be customized by each healthcare professional involved in a patient's care.

Referring to Fig. 3, a sample screen for the graphical user interface of the administrator component is shown. As shown in Fig. 3, the present invention may be configured to meet the needs of the facility in which it is operational. As shown in Fig. 3, the use of transplant specific information in accordance with a configured application is optional.

A plurality of standard screens may be defined for each application configured for use by a hospital, medical center, etc. The administrator supports the selection of standard screens to include in a configured application and specific screen properties for the screens that comprise the application. Referring to Fig. 4, screen properties for screens that comprise an application may be modified. Referring to Fig. 5, the standard screens to be included in a configured application may be selected through the administrator. Referring to Fig. 6, for

each configurable screen, the administrator provides a variety of options for managing the information appearing on the screen. For example, fields may be added or deleted from a screen, the display order for fields may be modified, and the field type and field width may be modified. In addition, various attributes may be associated with each field appearing on a customized screen. For example, a field may be defined to be required or modifiable and a user may specify whether the field's value is found in a lookup table.

Referring again to Fig. 2, the pre-transplant component 32 provides for tracking of patients who may become candidates for transplants. The pre-transplant component supports the entry and review of patient data 44. Initially, an individual who is referred is considered a referral of the chronic patient management system. An individual who meets certain criteria and is determined to be eligible to receive an organ is considered a candidate of the chronic patient management system. In a preferred embodiment of the present invention, data for referrals is not fully accessible within the patient management system while data for candidates (i.e., patients eligible to receive organs) is fully accessible within the patient management system. A complete patient history may be developed for use in determining whether a patient is eligible for a transplant. The complete patient history may be developed from patient data, clinical data, and administrative data related to the patient. Data from the patient's primary care physician may be evaluated in addition to data from other healthcare professionals the patient has seen. Insurance and other information relevant to the patient's care may be used in evaluating a patient's eligibility for a transplant.

The post-transplant component 42 supports the efficient management of medical care for patients who have received transplanted organs. The post-transplant component 42 also supports the management of medical care for patients who have chronic illnesses. Preferably,

it provides forms for the collection and display of patient, clinical, administrative, medical, demographic, insurance, and other data. The post-transplant component quickly displays longitudinal laboratory data on easy to interpret forms for individual patients.

Referring to Fig. 7, a schematic drawing of a pre-transplant component for a preferred embodiment of the present invention is shown. The pre-transplant component comprises a plurality of components or processes for interacting with the patient management system database 38. The pre-transplant component supports the entry and review of several hundred parameters or data values and creates electronic charts. The data is organized in a manner so that a physician or healthcare professional can use the screens easily in a clinical setting and so that reporting on any parameter or data value may be completed easily. The pre-transplant component for a preferred embodiment of the present invention comprises a referrals component 50, a living donor component 54, a cadaveric donor component 58, an insurance component 62, a lab batteries component 66, a medical evaluations component 70, a summary component 74, a checklist component 80, and a tissue typing component 90.

The referrals component 50 supports the entry and review of referral data 52 that relates to a patient who may become a candidate for a transplant. Patients who are chronically ill are typically referred by their primary care physicians to specialists who can assist the patient with management of the illness. In some cases, replacement of one or more organs may be necessary to manage the patient's illness. The referrals component 50 may be used to start the process of creating a complete and comprehensive patient record so that the patient's chronic illness is managed appropriately. An individual who is referred is considered a referral. If a patient meets all criteria for receiving an organ, the patient becomes a candidate.

Referring to Fig. 8, a sample screen for adding a new patient to the chronic patient management system is shown. Identifying information such as the patient's name, medical record number (MRN), and social security number (SSN) may be entered. If a patient is a possible candidate for a specific organ, information identifying the organ type may be entered. Finally, insurance information may be entered.

Referring to Fig. 9, information regarding the referral may be provided. Information from the screen in which the new referral information was added may be carried over to the referral list screen. For the identified referral, information regarding the referring physician and his or her location and information regarding the patient's general diagnosis may be provided.

Referring again to Fig. 7, a living donor component 54 supports the entry and review of living donor data 56. Referring to Fig. 10, information or data regarding a living donor for a referral may be entered. Preferably, the living donor information is linked to the referral information so that the list of living donors for a patient may be located easily. In addition to identifying and contact information for a living donor, demographic information and information regarding the donor's physical condition may be entered and reviewed. Living donors are typically individuals who may be able to provide a kidney to a patient.

Referring again to Fig. 7, a cadaveric donor component 58 supports the entry and review of cadaveric donor data 60. Information may also be tracked for cadaveric donors. Typically, the information is minimal and very confidential. Tissue typing information may be added for cadaveric donors to determine whether the donor is a good match for a particular patient. Cadaveric donor information may be linked to a patient.

In a preferred embodiment of the present invention, after referral or donor information is added, the referral data may be accessed only for tissue typing tests and for monthly statistics via a monthly referral/activation report. Preferably, referrals are not fully active in the system until they have been "added." Once a patient meets all the necessary criteria for becoming eligible to receive an organ, the patient is considered a candidate rather than a referral. Preferably, patient data for referrals who do not become candidates (because they do meet the necessary criteria) is deleted from the patient management system databases. Preferably, living and cadaveric donor information may be fully accessible once it has been entered although not all options in the system may be available for donors. Preferably, once enough medical and demographic information has been entered for a patient, the patient information is added to the system such that it is fully accessible in addition to being accessible for tissue typing tests and for monthly statistics.

Referring to Fig. 7, an insurance component 62 supports the entry and review of insurance data 64. Referring to Fig. 11, insurance data for a patient may be entered. The insurance information may include information about the provider, the general coverage provided, the prescription coverage provided, and the transplant coverage provided. In addition, third party payer information may be entered. Current information regarding the patient's insurance is important in ensuring that, to the extent possible, the patient's treatment is subject to the patient's insurance policy.

Referring again to Fig. 7, a lab batteries component 66 supports the entry and review of lab battery data 68. Referring to Fig. 12, lab battery data for a patient may be entered or recorded. The lab battery data screen is designed for rapid entry of laboratory values. The data may apply to a specific organ so that the most common lab tests are available based on

organ type. Preferably, for each of the data fields shown, a user may enter "P" for positive and "N" for negative. Numeric data may also be entered. Preferably, the lab battery data is stored according to date. One patient may have a number of lab data records.

Referring again to Fig. 7, the medical evaluations component 70 of the pre-transplant component contains functions for transplant patients and living donors. The medical evaluation information, which may comprise lab data, test data, physical exam data, and problem list data 72, may be used to determine whether a particular donor is a good match for a patient. When determining whether a donor is a good match for a patient, a physician considers a number of factors regarding the donor's physical condition. The physician would like to know that if the donor's organ is transplanted, it is likely to be accepted by the recipient patient. Data from lab procedures and tests performed on the transplant candidate and donor may help the physician determine the likelihood of rejection. Therefore, the present invention is designed to make the information used in making a determination readily available.

Referring to Fig. 13, the labs screen displays all laboratory results for a candidate who may be a recipient or a donor. Any result entered or recorded from a lab battery screen as shown in Fig. 12 may be displayed. Preferably, a single laboratory value may be entered on the screen. In addition, an expiration date may be assigned to the lab. The expiration date is important in monitoring a patient's eligibility for an organ transplant or a donor's potential in offering an organ. For example, a physician may order an AFP on a patient. The result may be elevated. The physician then determines that the patient cannot be transplanted unless the AFP is repeated in three months. When the initial AFP is entered or recorded into the system, an expiration date may be added to the test result. In monitoring the patient's eligibility for a

transplant, a report may be generated to determine if the patient has lab results that are ready to expire. If the report shows that certain lab results are ready to expire, the patient may be called for an appointment to have the lab repeated. In the example, the patient may be called to have the AFP repeated. If the results are elevated once again, the expiration date may indicate that the patient should be called again. If the results are as expected, other factors may be examined to determine whether the patient is eligible for a transplant.

Preferably, the labs screen displays results by date, then lab. Optional filters allow viewing by month, expired labs, and individual labs. The flexibility in viewing information allows a user to select the most appropriate method of displaying the information. Preferably, new labs may be added. Labs may then be selected individually. Filters may be available to view by lab group (chem, heme, etc.). Preferably, an expired lab is displayed in a different color such as red to indicate clearly to the user that the lab has expired.

Referring to Fig. 14, the tests screen displays results by date, then test. Tests may include EKG, Stress MUGA, MRI, etc. An expiration date may be assigned to the test. As explained above, the expiration date is important in monitoring a patient's eligibility for an organ transplant or a donor's potential in offering an organ. Optional filters allow viewing by month, expired labs, and individual tests. Preferably, new tests may be added. Tests may then be selected individually. Filters may be available to view by test group (radiology, cardiology). Preferably, an expired lab is displayed in a different color such as red to indicate clearly to the user that the lab has expired.

Referring to Fig. 15, physical exam data for a patient or a donor may be entered or recorded. A number of tabs may be provided for collecting data relevant to the physical examination. Preferably, notes fields are provided on the physical exam screens so that

telephone conversations and other medical information that is not entered or recorded elsewhere may be stored or recorded for each patient.

Referring to Fig. 16, a problem list screen supports tracking of organ system problems. An example of a problem to be tracked is a heart attack. A detailed wizard may be used to add information to the patient management system from a lookup table. Information related to key elements, organ system, symptoms, diagnostics, interventions, and a current plan may be entered or recorded.

Referring again to Fig. 7, a summary component 74 supports the entry and review of summary data 74. Referring to Fig. 17, a summary screen references data from multiple areas in the chronic patient management system. The summary screen provides a quick view of all information the physician needs to make a decision on whether or not to use a given organ in this patient. The information provided on the screen helps the physician determine which patients are qualified for receiving an organ and which donors are qualified for providing an organ.

Government regulations control many pre-transplant activities for a patient. Federal law requires tracking and monitoring of many aspects of a patient's condition or the patient cannot receive an organ. The present invention supports the pre-transplant activities through development of a pre-transplant checklist for each patient. Referring again to Fig. 7, a checklist component 80 supports the entry and review of checklist data 82. Referring to Fig. 18, a checklist screen and associated report generator displays checklist data that identifies the items for each patient that must be completed prior to a transplant. For example, lab and test results for certain procedures must be current before a patient may be considered a candidate for a transplant. The expiration dates associated with each lab or test result allow a healthcare

provider to track the patient's eligibility for a transplant. If lab or test results will expire soon, based on the associated expiration date, arrangements may be made to perform the required procedure. Specific reports may be accessed to further assess the patient's eligibility.

Tissue typing is an important aspect in determining whether a patient and a donor match so that an organ may be transplanted from the donor to the patient. A physician considers a number of factors when evaluating matches between patients and donors. An important goal in matching is minimizing the likelihood of rejection of the transplanted organ by the recipient. The present invention supports several activities related to tissue typing so that the information needed by the physician is readily available. Referring again to Fig. 7, a tissue typing component 82 supports the entry and review of tissue typing data 84. Referring to Fig. 19, HLA information may be evaluated by a physician in determining whether a patient and a donor match. Referring to Fig. 20, HLA information for a candidate (recipient or donor) may be entered or recorded.

The HLA provides general information regarding the compatibility between a patient and a possible donor. Another important factor to consider in determining whether a particular donor's organ may be used in a patient is the percent reactive antibody or PRA. The PRA provides an indication of the likelihood that a patient will reject a transplanted organ. A low PRA value indicates a low likelihood of rejection. A high PRA value indicates a high likelihood of rejection. To perform a PRA test, cells from a donor and serum from a patient are combined and an antibody measurement is taken. If the number of antibodies present is high, then the PRA value is high. As potential donors for a patient are identified, the PRA test may be performed.

Referring to Fig. 21, PRA data may be displayed for review. A physician may review the information to evaluate whether a patient and donor may be matched. Referring to Fig. 22, PRA data may be entered or recorded. Associated antibody specificities based on a workgroup sheet may be used in evaluating the data. Referring to Fig. 23, antibody specificities may be added. Referring to Fig. 25, workgroups may be defined for creating antibody specificities. Preferably, samples may be added to the workgroup under creation by clicking on an entry appearing on the screen. Referring to Fig. 26, cross match information may be evaluated, also in accordance with workgroups. Workgroups may be constructed and modified as described for PRA. Also data may be entered in a form as described for PRA. Referring to Fig. 27, serum data may be entered or recorded for a candidate. As described above, serum data for a patient is used in determining PRA values. Therefore, serum data may be tracked so that PRA data may be developed.

Referring to Fig. 28, a schematic drawing of the primary components for the post-transplant component for a preferred embodiment of the present invention is shown. The post-transplant component comprises a plurality of components or processes for interacting with the patient management system database 38.

The medications component 100 supports the entry and viewing of patient medications to assist a healthcare professional in regulating medications and developing or altering a treatment plan. Medication data may be presented to a user as shown in Fig. 29. The information shown for each medication may include start date and end date, class, drug, dose, units, route, and frequency. The prescriptions are inserted into the medications records when the insert button is clicked. Other medication data may be added to patient's medications information using a select medication form as shown in Fig. 30. Preferably,

medications may be selected from a list so that a user is not required to type the information. After the needed medication name is highlighted and the other required elements are completed (start date, end date, dose, units, and frequency), selection of the OK button adds the prescription to the medication records. Additional information such as prescriber, title, and free-text comments may be provided.

Referring again to Fig. 28, the medications taper component 104 provide special functions related the regulation of a medication that may be prescribed to many transplant patients. For example, Prednisone is typically prescribed to many transplant patients. Prednisone is typically prescribed with an initial dose, which is then gradually reduced or tapered at a predetermined rate over a period of a year starting at the initial dose. The doses are dependent on the patient's weight. The prednisone component 104 uses dosage data 106 to construct a series of Prednisone prescriptions of 11 specific doses over the prescribed time period based on the weight of the patient and the starting date of the first dose of the series. Referring to Fig. 31, the user may start the computation of the Prednisone prescription by selecting the patient's weight from a list and selecting a compute button. Preferably, the recommended dosage is shown on the chart for each weight so that a user may know what is recommended. Referring to Fig. 32, the computed dosages for the entered weight are shown. A recommended dosage and start/end date pair is shown so that the dosage administered to the patient is appropriate. Although described in relation to Prednisone, the medications taper component may be used for any type of medication in which doses over time may be prescribed. This medication taper feature of the present invention facilitates the care of transplant patients by providing readily available dosage information based on a patient's weight.

High blood pressure is a significant cause of organ failure. A kidney transplant typically does not correct the underlying disease causing high blood pressure, which uncontrolled can lead to early graft failure. Unregulated high blood pressure in transplant patients may result in serious consequences. Referring again to Fig. 28, the blood pressure component 108 produces a specialized graph that presents blood pressure and anti-hypertensive medication data 110 to assist a clinician in determining the effectiveness of blood pressure medication classes on the regulation of high blood pressure. Referring to Fig. 33, an example of a chart that graphs the patient's blood pressure and the administration of anti-hypertension medications for the selected patient is shown. Preferably, the time period to be graphed may be specified as months after the transplant (months post tx) or by date range. Preferably, the units on the axis scale may also be selected by clicking on the needed items. The patient systolic, diastolic blood pressure, and MAP (Means Arterial Pressure) may be graphed on the top of the chart. Below the blood pressure lines the administration of blood pressure medications is displayed grouped by the class of anti-hypertensive medication. The class of medication depends on the method of action on blood pressure. The blood pressure information provided by this feature of the present invention is important in assessing the condition of a transplant patient. A clinician reviewing the blood pressure information for a patient may decide to alter the patient's current treatment plan or to order additional tests. The blood pressure presentation feature of the present invention facilitates the care of transplant patients by providing readily available information regarding a patient's condition and its relationship to the medications the patient has been taking.

Rejection episodes of transplanted organs are conditions that must be monitored carefully. How effectively a rejection episode can be resolved is useful in determining how

much function was lost as a result of a rejection episode. Therefore, it is very important to record information about rejection episodes for later review and analysis. Referring again to Fig. 28, the rejection episode component 112 supports the entry and review of event data, biopsy data, and episode data 114 for the effective management of rejection episodes.

Referring to Fig. 34, an acute rejection form presents data about acute rejection episodes. Each rejection episode that a patient experiences may be assigned a number so that it may be tracked. Information regarding anti-lymphocyte therapy, steroid, and conversions may be shown for each rejection episode. For chronically ill patients who have not received transplants, acute episodes or flare-ups related to the patient's chronic illness may be tracked through the acute episodes component. By tracking acute episodes for a chronically patient, it is possible to monitor the frequency, severity, etc. of episodes. The ability to monitor episodes such as rejection episodes and acute episodes and view episode data assists healthcare professionals in developing treatment plans for patients. The treatment plan may include adding or changing medications, ordering additional tests or procedures, altering a patient's diet, or any one of a number of activities that may improve the patient's health condition.

Selection of the biopsy button on the screen of Fig. 34 may result in the display of the specific biopsy information as shown in Fig. 35. As shown in Fig. 35, details regarding each biopsy may be shown. Another important aspect of monitoring rejection episodes is tracking of creatinine levels. Selection of the creatinine graph button of Fig. 34 may result in the display of a graph of creatinine levels from one month before and after a selected rejection episode as shown in Fig. 36. The specialized screen of Fig. 36 graphs a number of creatinine averages and individual values that are reflective of renal function. Preferably, colored lines

are used in the graph to indicate all of the creatinine values, the patient's average creatinine before and after the rejection episode, and the lowest (best) creatinine since transplantation. This creatinine graph feature of the present invention is very helpful in assessing the patient's condition and the need for any modifications to the patient's treatment plan.

Managing a large number of patients increases the difficulty in monitoring the problems an individual patient may have. An organ system specific problem list allows documentation and monitoring of an unlimited number of problems for each patient. With the present invention, the user may easily document a problem by selecting from a number of organ system specific symptoms, interventions, and diagnostic tests. A current treatment plan may also be documented. The treatment plan may include details regarding the patient's medications, diet, tests or procedures, and other activities designed to improve the health of the patient. This problem list feature allows the caregiver to quickly focus on the status of specific problems that are of concern for each patient.

Referring again to Fig. 28, organ specific problems may be documented using a problem lists component 116. Data regarding symptoms, interventions, tests, and plans 118 may be tracked. A series of forms allows the user to document the specific problem and select associated symptoms, interventions, and diagnostic tests. Referring to Fig. 37, a problem list summary form shows all of the recorded problems for a selected patient. For each problem in the list, a date, TPT, status, presenting symptom, organ system, problem description, and pre-transplant/post-transplant indicator may be provided. Preferably, the information appearing in the problem list may be filtered by specifying a particular status (e.g., active or hot), specifying an organ system (e.g., cardiac, ophthalmic, skin, etc.), or specifying the display of symptoms without problems. The ability to record and review

problem data may be important in identifying rejection episodes in a patient or determining or altering a treatment plan. Preferably, new problems may be added to the problem list by completing a series of forms. Referring to Fig. 38, the user may first select a problem by identifying an organ system, selecting a problem associated with the organ system, identifying a date for the problem, identifying the status of the problem, and selecting an indicator as to whether the problem occurred pre- or post-transplant. Referring to Fig. 39, the user may identify the symptoms that occurred on a specific date. Referring to Fig. 40, the user may identify interventions that occurred on a specific date. Referring to Fig. 41, the user may identify the diagnostics that were performed on a specific date. Finally, referring to Fig. 42, the user may enter in a current plan section free-text to be associated with the current problem definition. The current plan section allows the user to document any other information required. The details of previously entered or recorded problems may be reviewed or modified as necessary so that a complete and comprehensive record may be developed for the patient.

Other useful tools for the management of the chronically ill patient are the lab data analysis components. Referring again to Fig. 28, the lab data forms for organ specific lab data analysis 120 and general lab data analysis 126 present data in a similar format. The information provided may include organ specific lab data 122 and general lab data 126. The kidney lab data form of Fig. 43 is typical of the format. Referring to Fig. 43, lab data that is organ specific or general may be view in tabular form by lab date, by time post transplant, or by time in comparison to a specified date. Referring to Fig. 44, a sample form for adding new data to organ specific or general lab data is shown.

Referring again to Fig. 28, in addition to standard screen definitions, new screen definitions are easily developed using a dynamic charting system or "chart expert." The custom charts component 130 comprises a chart expert allows the user to dynamically graph user selected data 132 for any of number items from any lab data forms. The type of chart, the items graphed, the time period and the time interval may all be selected at the time the chart is displayed and printed. Referring to Fig. 45, a chart expert form for a preferred embodiment of the present invention is shown. Several item(s) may be specified by clicking the appropriate check box or radio button. These items include:

- Chart Title
- Items to be graphed (Select Data Series (Y Axis))
- Chart Type (Line, Bar, 3D)
- Data Range by Days Post-Transplant or Date Range
- Axis Scale
- Inserting a Legend
- Filling in Missing Data

An example of a chart completed in accordance with the chart expert is shown in Fig. 46.

The chronic patient management system of the present invention supports the management of medical care for chronically ill patients. The integrated interface, administrator, pre-transplant, and post-transplant components of the patient management system are designed so that many important aspects of patient's chronic illness may be tracked and monitored. Sub-components within the pre- and post-transplant components support the entry and review of data that is particularly important in managing care for transplant patients. The patient data that is collected and reviewed allows all of the healthcare professionals involved in a patient's care to develop a treatment plan and evaluate the effectiveness of the treatment plan. A longitudinal permanent patient record that is developed

using the system may be used for daily patient management and for performing aggregate studies on a population. In a preferred embodiment of the present invention, transplant related information for patients is collected, monitored, and reported. The present invention, however, may be used for tracking of information related to any chronic illness or condition.

The preferred embodiments herein disclosed are not intended to be exhaustive or to unnecessarily limit the scope of the invention. The preferred embodiments were chosen and described in order to explain the principles of the present invention so that others skilled in the art may practice the invention. Having shown and described preferred embodiments of the present invention, it will be within the ability of one of ordinary skill in the art to make alterations or modifications to the present invention, such as through the substitution of equivalent components and arrangements, or through the use of equivalent process steps, so as to be able to practice the present invention without departing from its spirit as reflected in the appended claims, the text and teaching of which are hereby incorporated by reference herein. It is the intention, therefore, to limit the invention only as indicated by the scope of the claims and equivalents thereof.

WHAT IS CLAIMED IS:

1. A patient management system comprising:

a patient management system database for storing data related to patients;

a pre-transplant component for entering and retrieving from the patient management system database data related to patients to determine if the patients are eligible for organ transplants; and

a post-transplant component for entering and reviewing data related to patients to manage the care of patients with transplanted organs.

2. The patient management system of claim 1 further comprising an administrator module for configuring screens for interacting with the patient management system database.

3. The patient management system of claim 1 further comprising an interface component for importing data to and exporting data from the patient management system database.

4. The patient management system of claim 1 further comprising a referrals component, a living donor component, a cadaveric donor component, a lab batteries component, a medical evaluations component, a checklist component, and a tissue typing component.

5. The patient management system of claim 1 further comprising a medications taper component, a high blood pressure component, an episodes component, a problem list component, and a lab data analysis component.

6. The patient management system of claim 1 wherein the episodes component is selected from the group consisting of rejection episodes components and acute episodes components.

7. A method for managing medical care for transplant patients comprising the steps of:

entering in a patient management system database referral data for patients;

entering in the patient management system database clinical data for the patients;

reviewing the referral data and clinical data for the patients to determine which patients are eligible for transplanted organs;

entering in the patient management system database lab analysis data for the patients who have received transplanted organs;

entering in the patient management system database rejection episode data for the patients who have received transplanted organs; and

reviewing the lab analysis data and rejection episode data to develop treatment plans for the patients who have received transplanted organs.

8. The method of claim 7 further comprising the step of entering donor data for the patients.

9. The method of claim 7 further comprising the step of determining medications tapers for each of the patients who have received transplanted organs.

10. The method of claim 7 further comprising the step of reviewing tissue typing data to determine if donors and patients match.

11. The method of claim 7 wherein the step of reviewing the referral data and clinical data for the patients to determine which patients are eligible for transplanted organs comprises the step of reviewing checklist data for each of the patients.

12. The method of claim 7 further comprising the step of recording data in the patient management system database for medical evaluations of the patients and of donors.

13. The method of claim 7 further comprising the step of entering and reviewing blood pressure medication data for at least one of the patients.

14. The method of claim 7 further comprising the step of recording in the patient management system database data comprising symptom data, intervention data, test data, and plan data to develop a problem list for at least one of the patients.

15. A method for managing medical care for chronically ill patients, comprising the steps of:

entering patient data in a patient management system database for a plurality of chronically ill patients;

entering clinical data in the patient management system database for the plurality of chronically ill patients;

entering episode data in the patient management system database for the plurality of chronically ill patients; and

reviewing the patient data, clinical data, and episode data to develop a treatment plan for each of the plurality of chronically ill patients.

16. The method of claim 15 further comprising the step of entering a treatment plan in the patient management system database for each of the plurality of chronically ill patients.

17. The method of claim 15 further comprising the step of entering symptom data, intervention data, test data, and plan data to develop a problem list for each of the plurality of chronically ill patients.

18. The method of claim 15 further comprising the step of entering medications data for each of the plurality of chronically ill patients.

19. The method of claim 15 further comprising the step of entering and reviewing lab data for each of the plurality of chronically ill patients.

20. The method of claim 15 further comprising the step of configuring a new screen for

viewing data from the patient management system database.

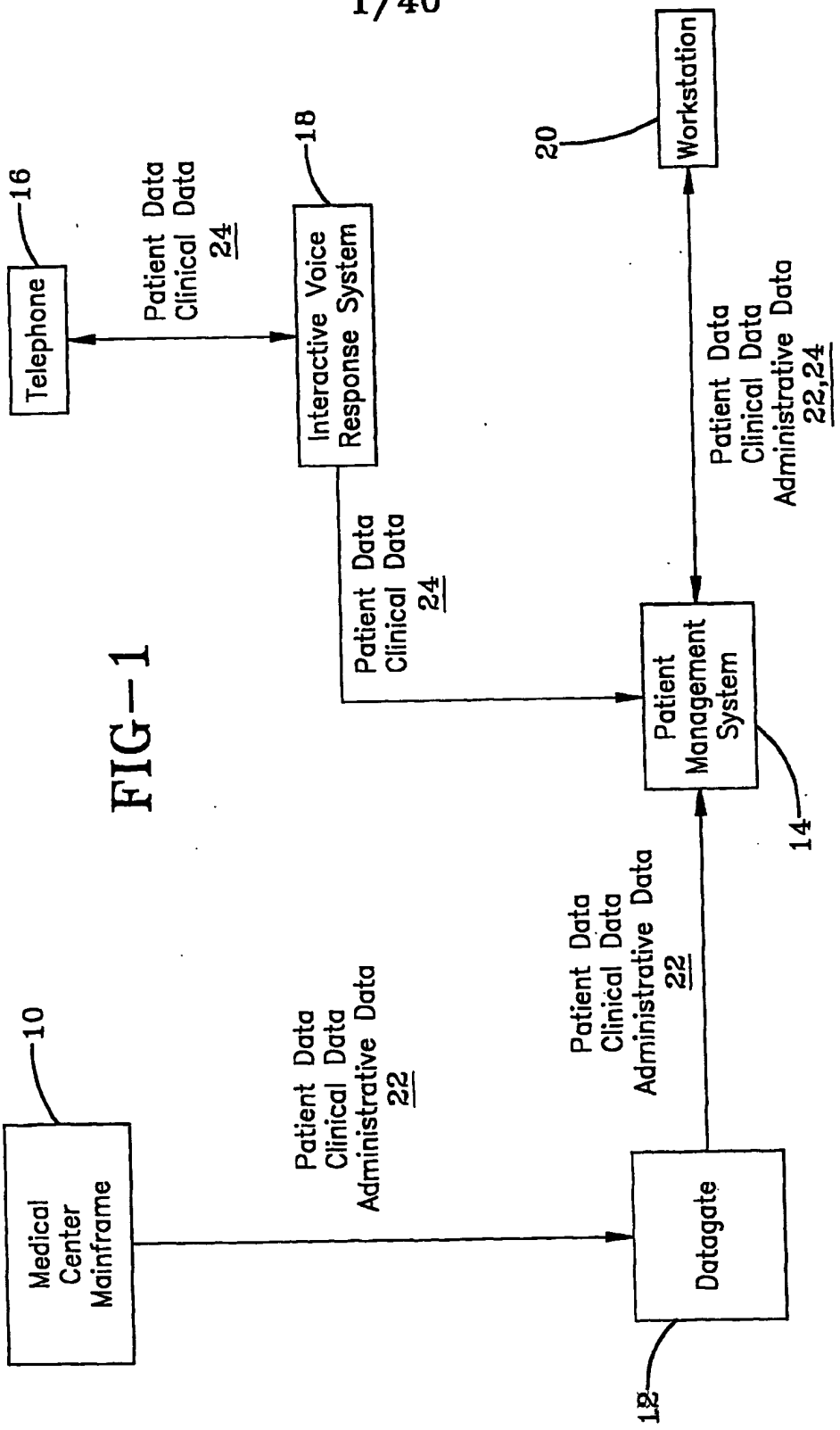

Medical Center Mainframe
10
Patient Data Clinical Data Administrative Data 22
Datagate
12
Patient Data Clinical Data Administrative Data 22
Patient Management System
14
Patient Data Clinical Data 24
Interactive Voice Response System
18
Patient Data Clinical Data 24
Telephone
16
Patient Data Clinical Data Administrative Data 22,24
Workstation
20

FIG-1

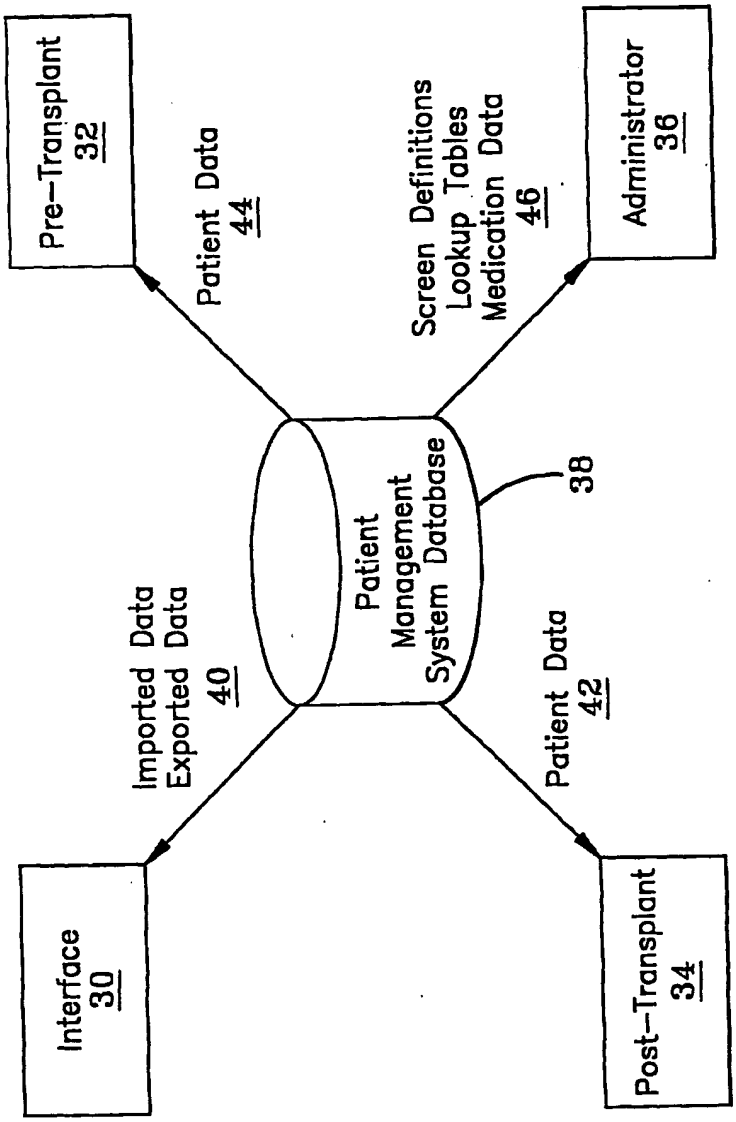

Pre-Transplant
32
Patient Data
44
Screen Definitions
Lookup Tables
Medication Data
46
Administrator
36
Patient
Management
System Database
38
Imported Data
Exported Data
40
Patient Data
42
Interface
30
Post-Transplant
34

FIG-2

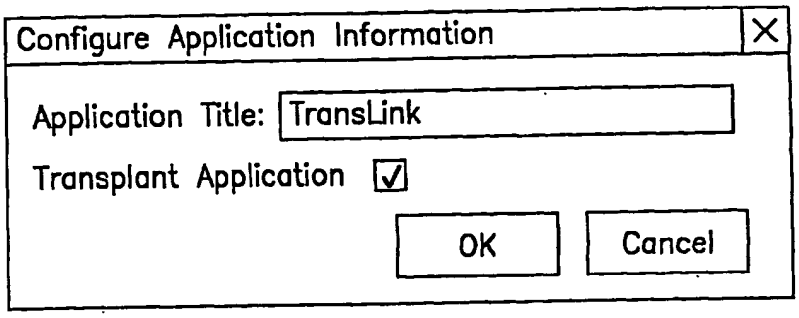

Configure Application Information
Application Title: TransLink
Transplant Application
OK
Cancel

FIG-3

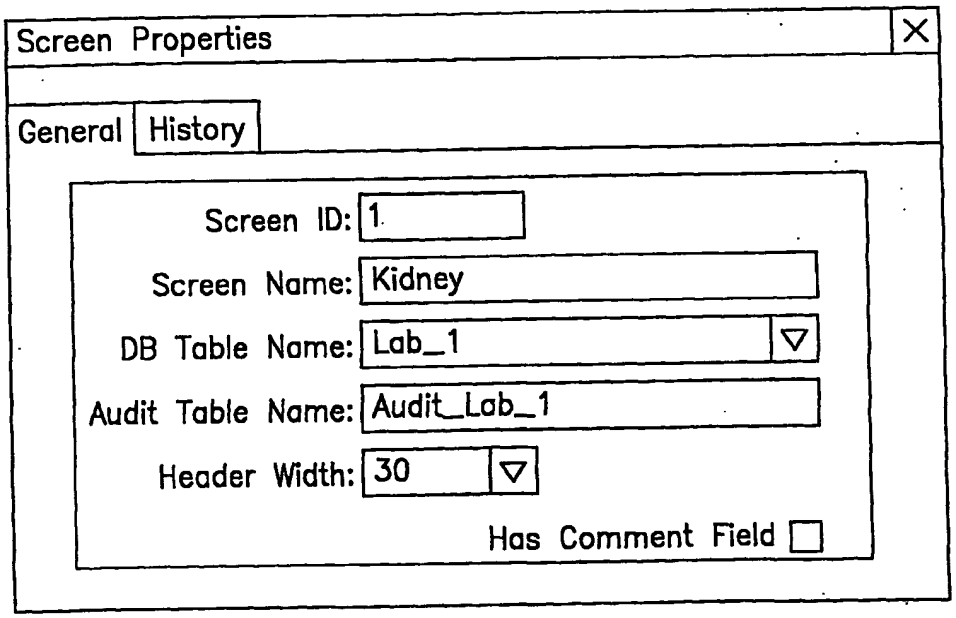

Screen Properties
General
History
Screen ID: 1
Screen Name: Kidney
DB Table Name: Lab_1
Audit Table Name: Audit_Lab_1
Header Width: 30
Has Comment Field

FIG-4

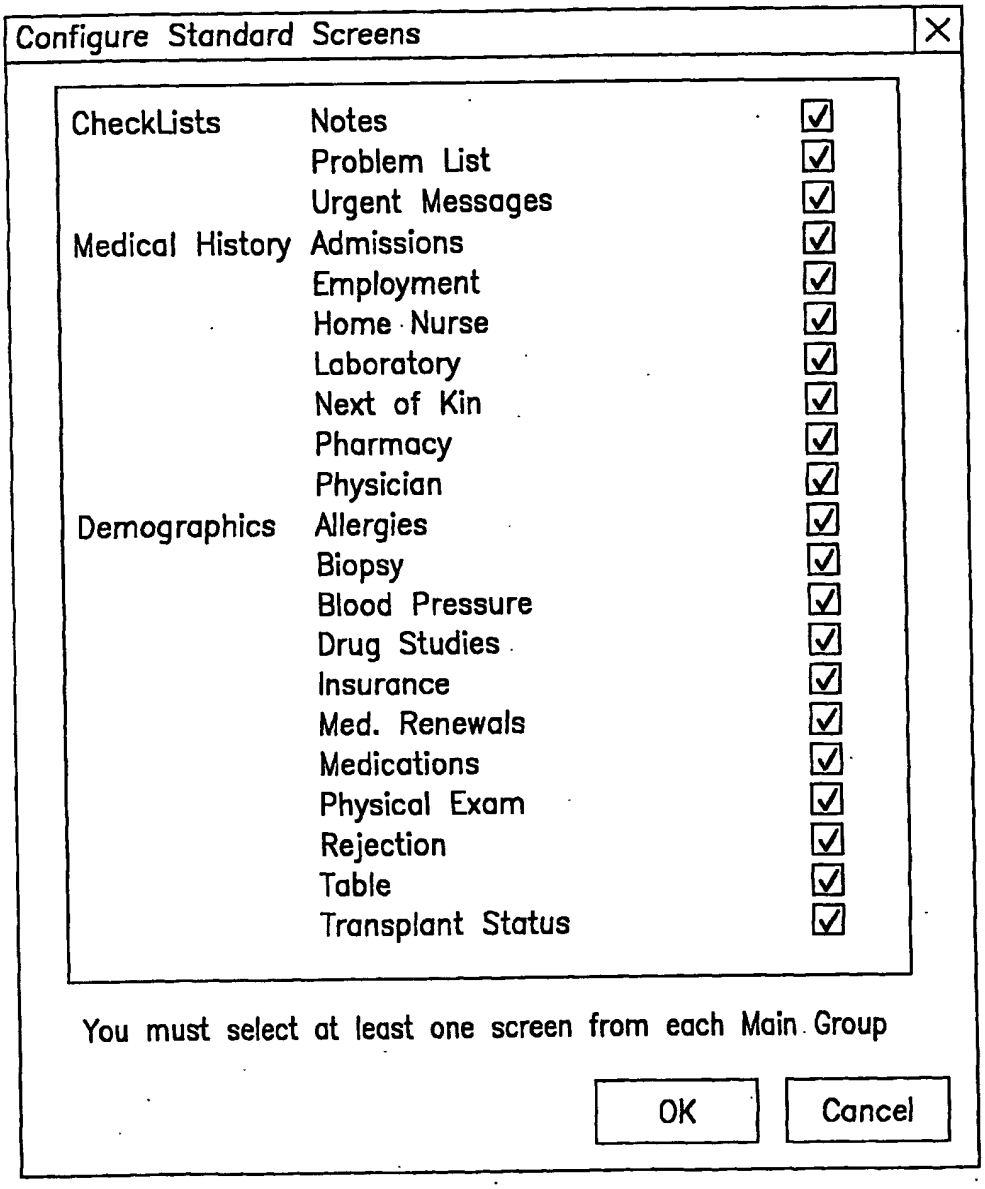

Configure Standard Screens
CheckLists
Notes
Problem List
Urgent Messages
Medical History
Admissions
Employment
Home Nurse
Laboratory
Next of Kin
Pharmacy
Physician
Demographics
Allergies
Biopsy
Blood Pressure
Drug Studies
Insurance
Med. Renewals
Medications
Physical Exam
Rejection
Table
Transplant Status
You must select at least one screen from each Main Group
OK
Cancel

FIG-5

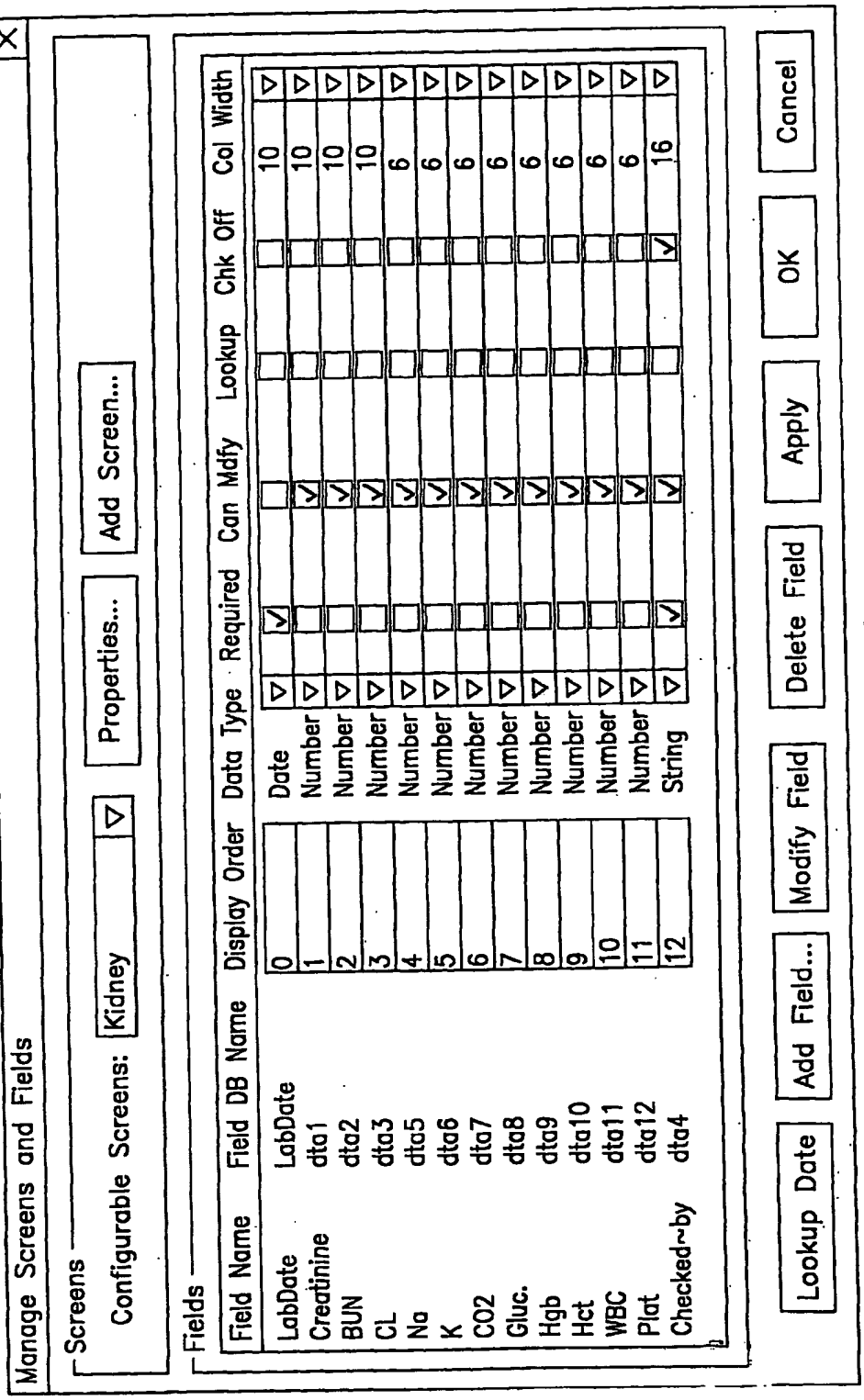

Manage Screens and Fields
Screens
Configurable Screens:
Kidney
Properties...
Add Screen...
Fields
Field Name
Field DB Name
Display Order
Data Type
Required
Can Mdfy
Lookup
Chk Off
Col Width
LabDate LabDate 0 Date 10
Creatinine dta1 1 Number 10
BUN dta2 2 Number 10
CL dta3 3 Number 10
Na dta5 4 Number 6
K dta6 5 Number 6
CO2 dta7 6 Number 6
Gluc. dta8 7 Number 6
Hgb dta9 8 Number 6
Hct dta10 9 Number 6
WBC dta11 10 Number 6
Plat dta12 11 Number 6
Checked~by dta4 12 String 16
Lookup Date
Add Field...
Modify Field
Delete Field
Apply
OK
Cancel

FIG-6

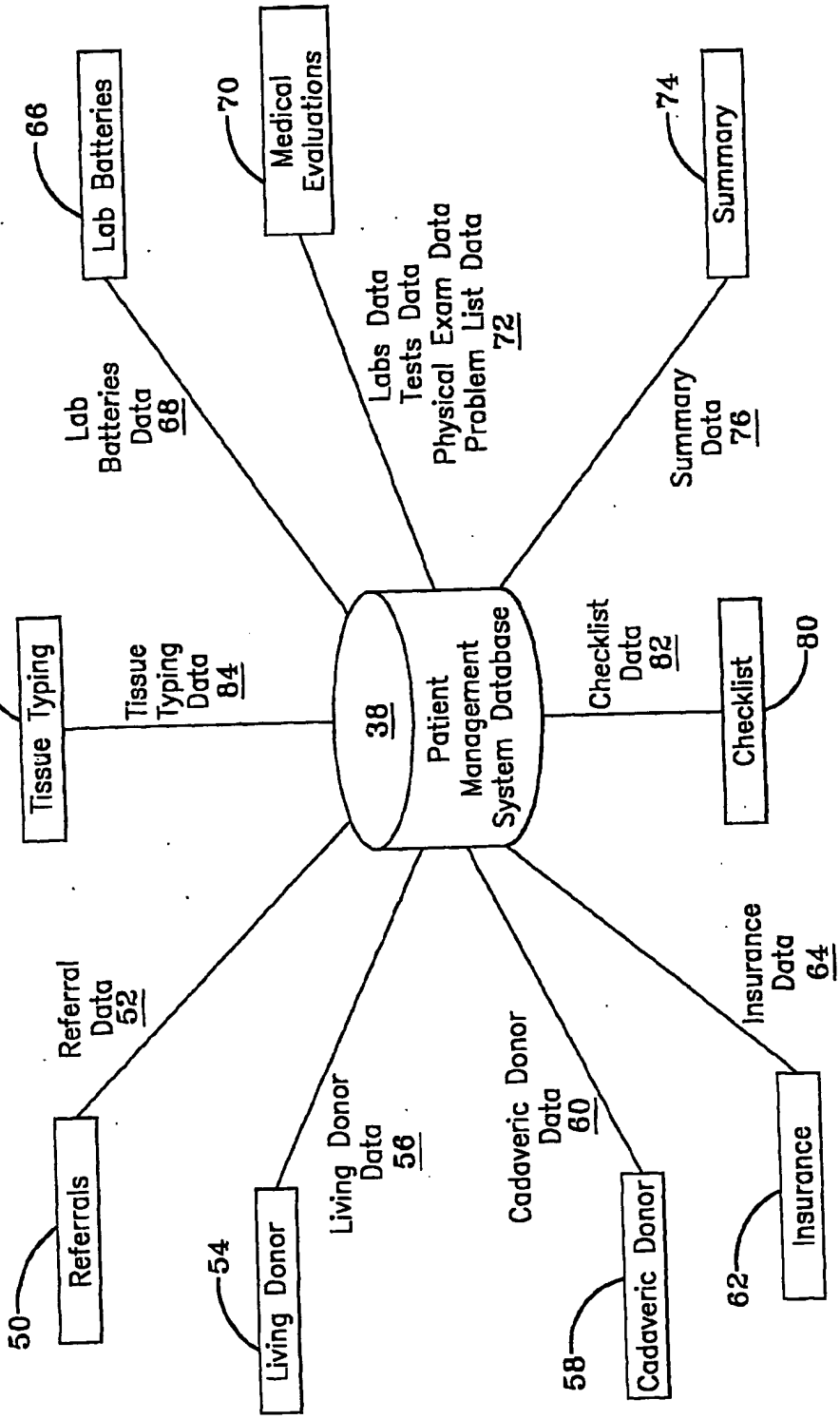

Patient Management System Database
38
Lab Batteries
66
Lab Batteries Data 68
Medical Evaluations
70
Labs Data
Tests Data
Physical Exam Data
Problem List Data
72
Summary
74
Summary Data 76
Tissue Typing
82
Tissue Typing Data 84
Checklist
80
Checklist Data 82
Referrals
50
Referral Data 52
Living Donor
54
Living Donor Data 56
Cadaveric Donor
58
Cadaveric Donor Data 60
Insurance
62
Insurance Data 64

FIG-7

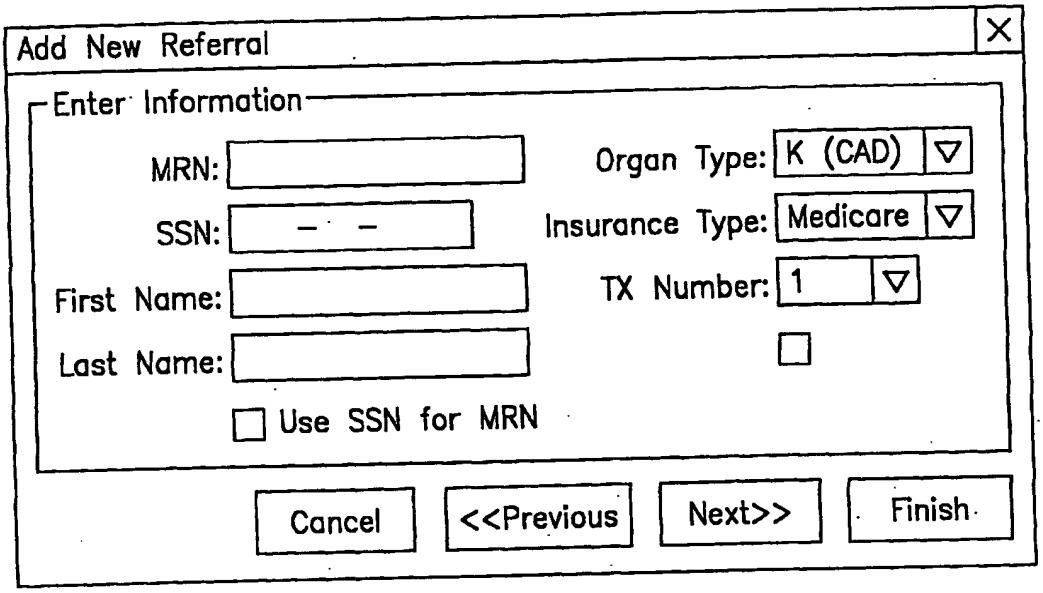

Add New Referral
Enter Information
MRN:
SSN:
First Name:
Last Name:
Use SSN for MRN
Organ Type: K (CAD)
Insurance Type: Medicare
TX Number: 1
Cancel
<<Previous
Next>>
Finish

FIG-8

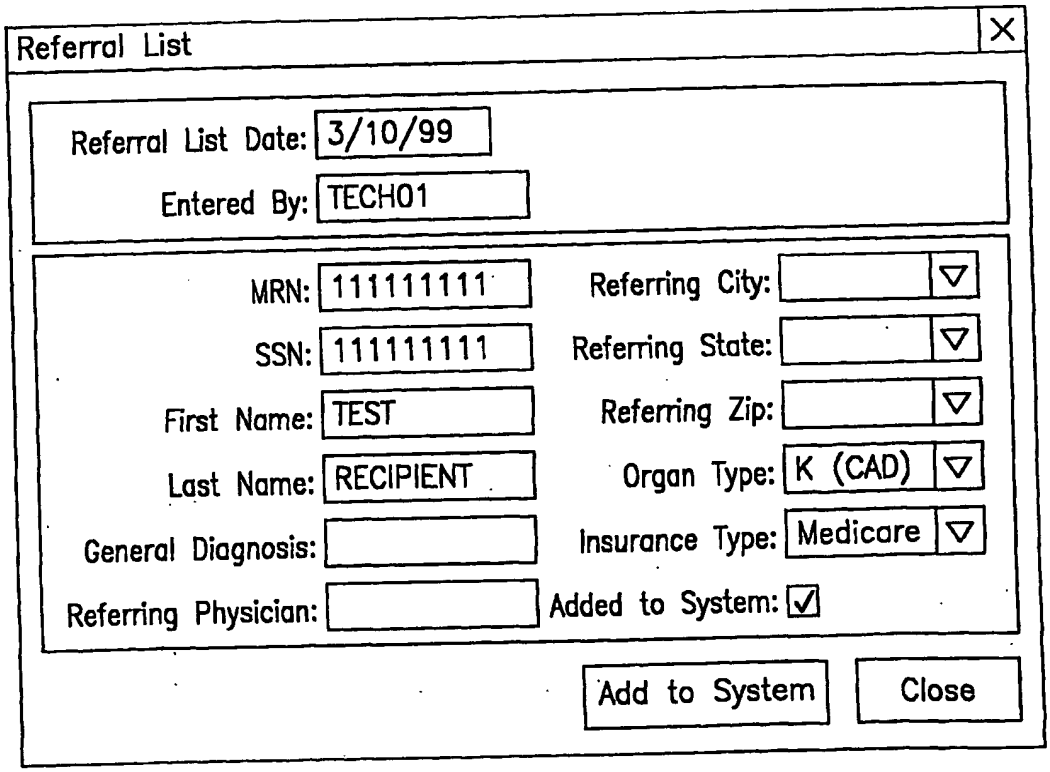

Referral List
Referral List Date: 3/10/99
Entered By: TECH01
MRN: 111111111
SSN: 111111111
First Name: TEST
Last Name: RECIPIENT
General Diagnosis:
Referring Physician:
Referring City:
Referring State:
Referring Zip:
Organ Type: K (CAD)
Insurance Type: Medicare
Added to System:
Add to System
Close

FIG-9

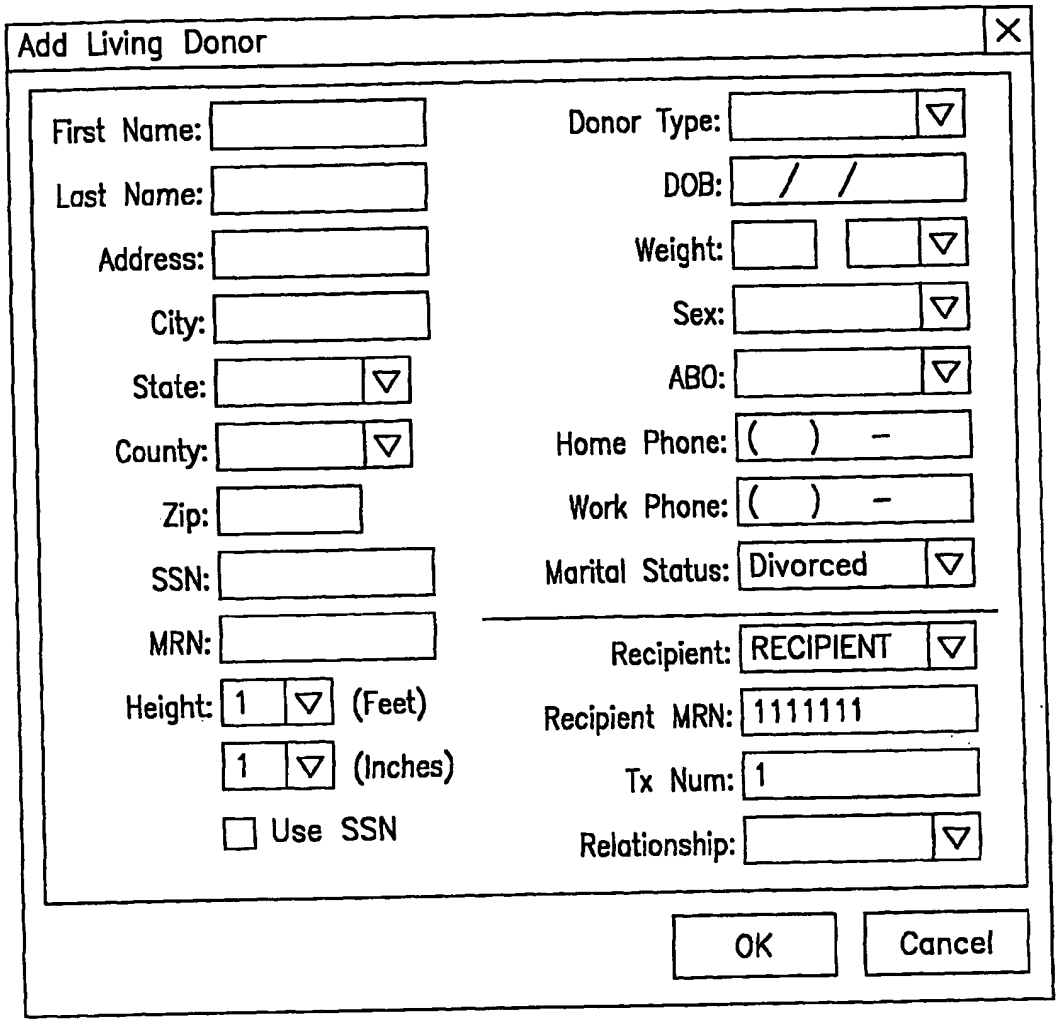

Add Living Donor
First Name:
Last Name:
Address:
City:
State:
County:
Zip:
SSN:
MRN:
Height: 1 (Feet)
1 (Inches)
Use SSN
Donor Type:
DOB: / /
Weight:
Sex:
ABO:
Home Phone: ( ) -
Work Phone: ( ) -
Marital Status: Divorced
Recipient: RECIPIENT
Recipient MRN: 1111111
Tx Num: 1
Relationship:
OK
Cancel

FIG-10

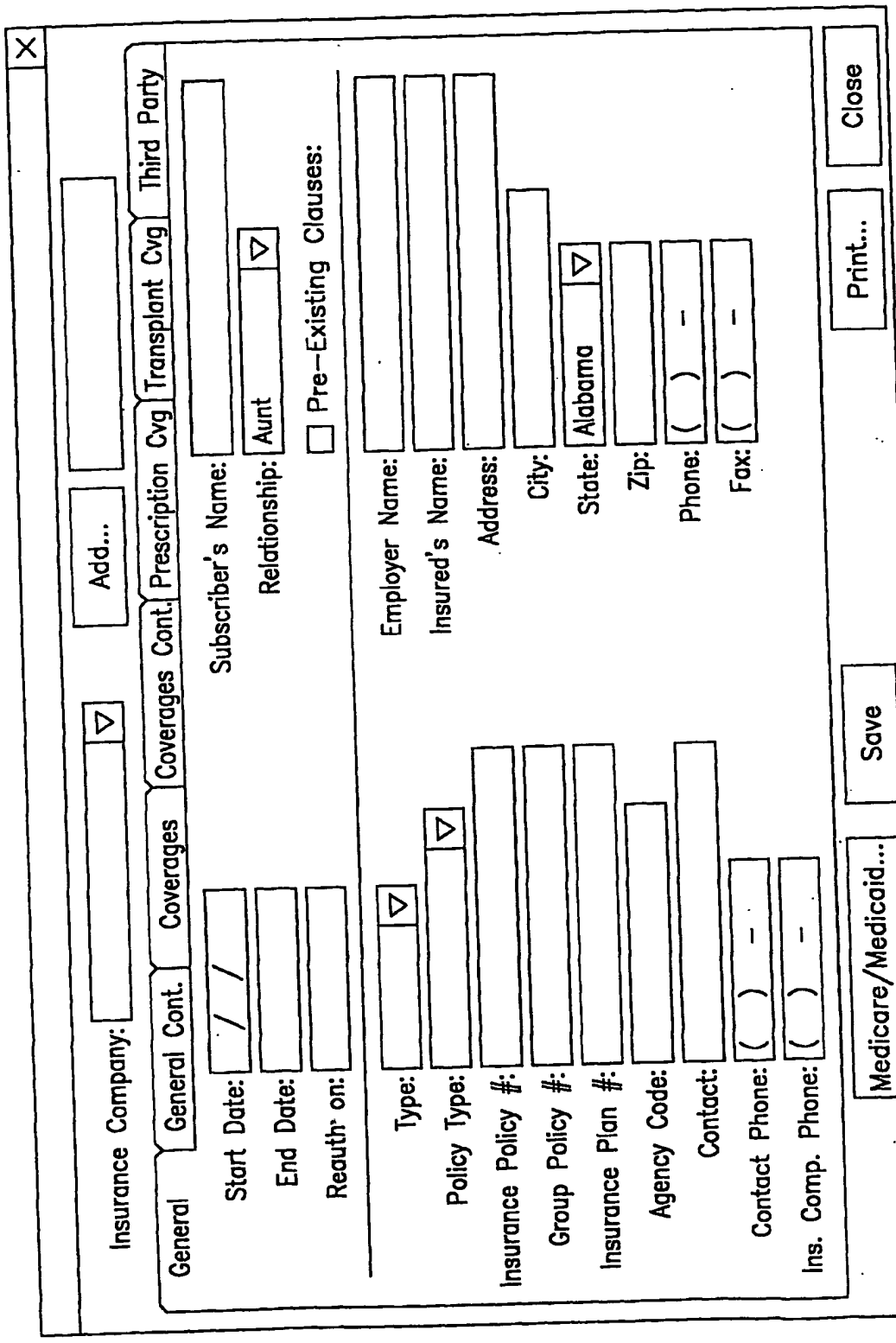

Insurance Company:
Add...
General
General Cont.
Coverages
Coverages Cont.
Prescription Cvg
Transplant Cvg
Third Party
Start Date:
End Date:
Reauth on:
Subscriber's Name:
Relationship:
Aunt
Pre-Existing Clauses:
Type:
Policy Type:
Insurance Policy #:
Group Policy #:
Insurance Plan #:
Agency Code:
Contact:
Contact Phone:
Ins. Comp. Phone:
Employer Name:
Insured's Name:
Address:
City:
State:
Alabama
Zip:
Phone:
Fax:
Medicare/Medicaid...
Save
Print...
Close

FIG-11

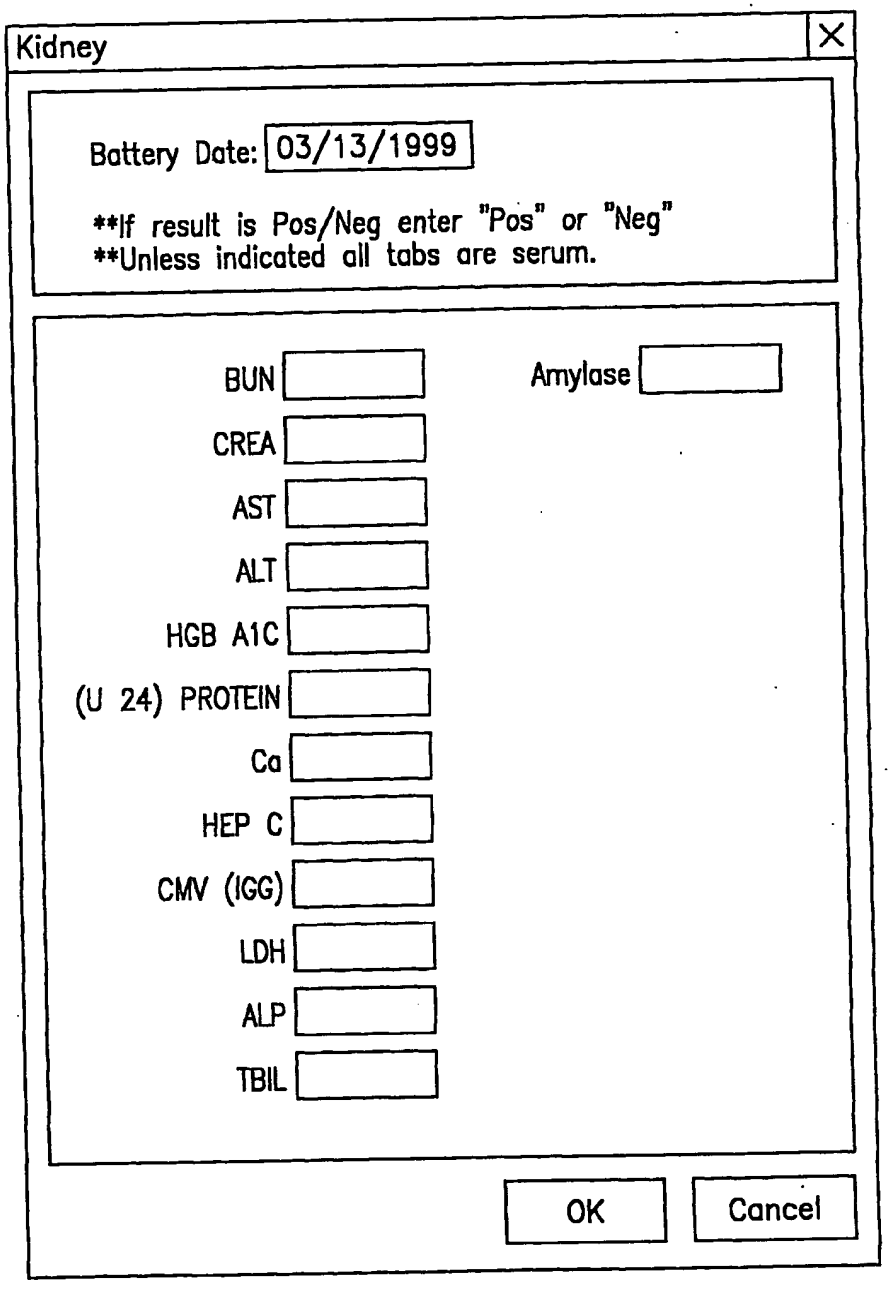

Kidney
Battery Date: 03/13/1999
**If result is Pos/Neg enter "Pos" or "Neg"
**Unless indicated all tabs are serum.
BUN
Amylase
CREA
AST
ALT
HGB A1C
(U 24) PROTEIN
Ca
HEP C
CMV (IGG)
LDH
ALP
TBIL
OK
Cancel

FIG-12

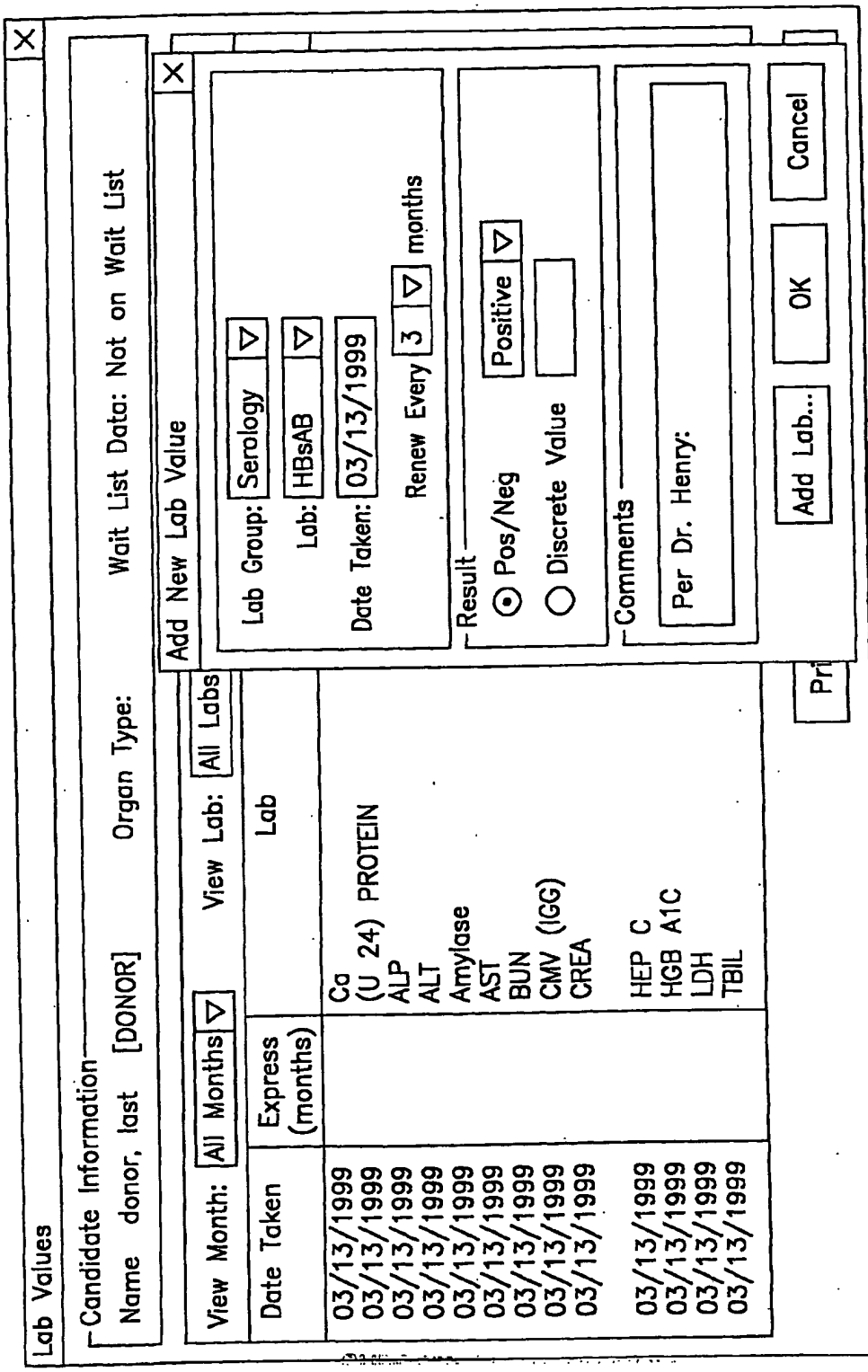

Lab Values
Candidate Information
Name donor, last [DONOR]
Organ Type:
Wait List Data: Not on Wait List
View Month: All Months
View Lab: All Labs
Date Taken
Express (months)
Lab
03/13/1999 Ca
03/13/1999 (U 24) PROTEIN
03/13/1999 ALP
03/13/1999 ALT
03/13/1999 Amylase
03/13/1999 AST
03/13/1999 BUN
03/13/1999 CMV (IGG)
03/13/1999 CREA
03/13/1999 HEP C
03/13/1999 HGB A1C
03/13/1999 LDH
03/13/1999 TBIL
Add New Lab Value
Lab Group: Serology
Lab: HBsAB
Date Taken: 03/13/1999
Renew Every 3 months
Result
Pos/Neg
Positive
Discrete Value
Comments
Per Dr. Henry:
Add Lab...
OK
Cancel

FIG-13

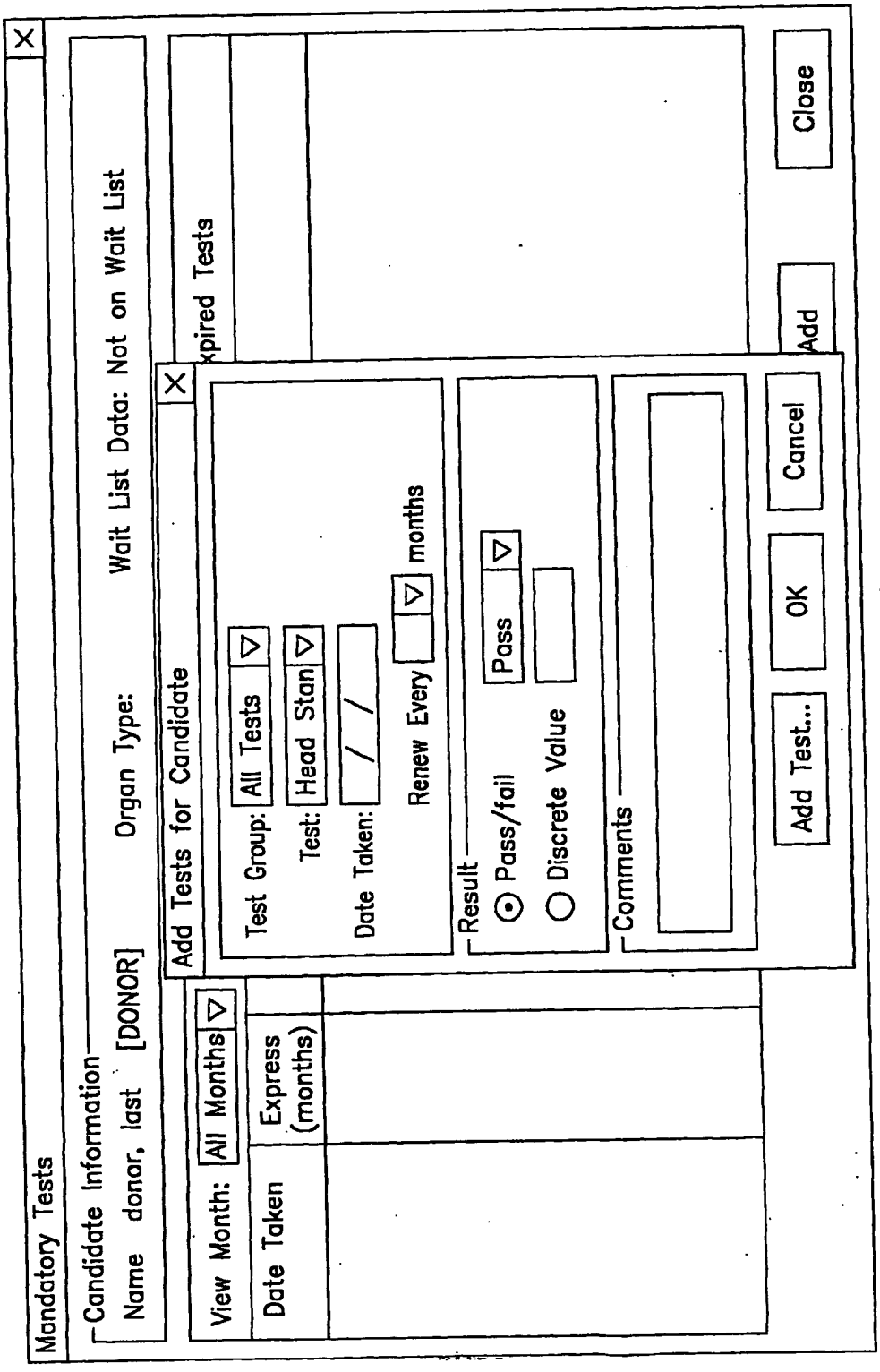

Mandatory Tests
Candidate Information
Name donor, last [DONOR]
Organ Type:
Wait List Data: Not on Wait List
View Month: All Months
Date Taken
Express (months)
Add Tests for Candidate
xpired Tests
Test Group: All Tests
Test: Head Stan
Date Taken: / /
Renew Every months
Result
Pass/fail
Pass
Discrete Value
Comments
Add Test...
OK
Cancel
Add
Close

FIG-14

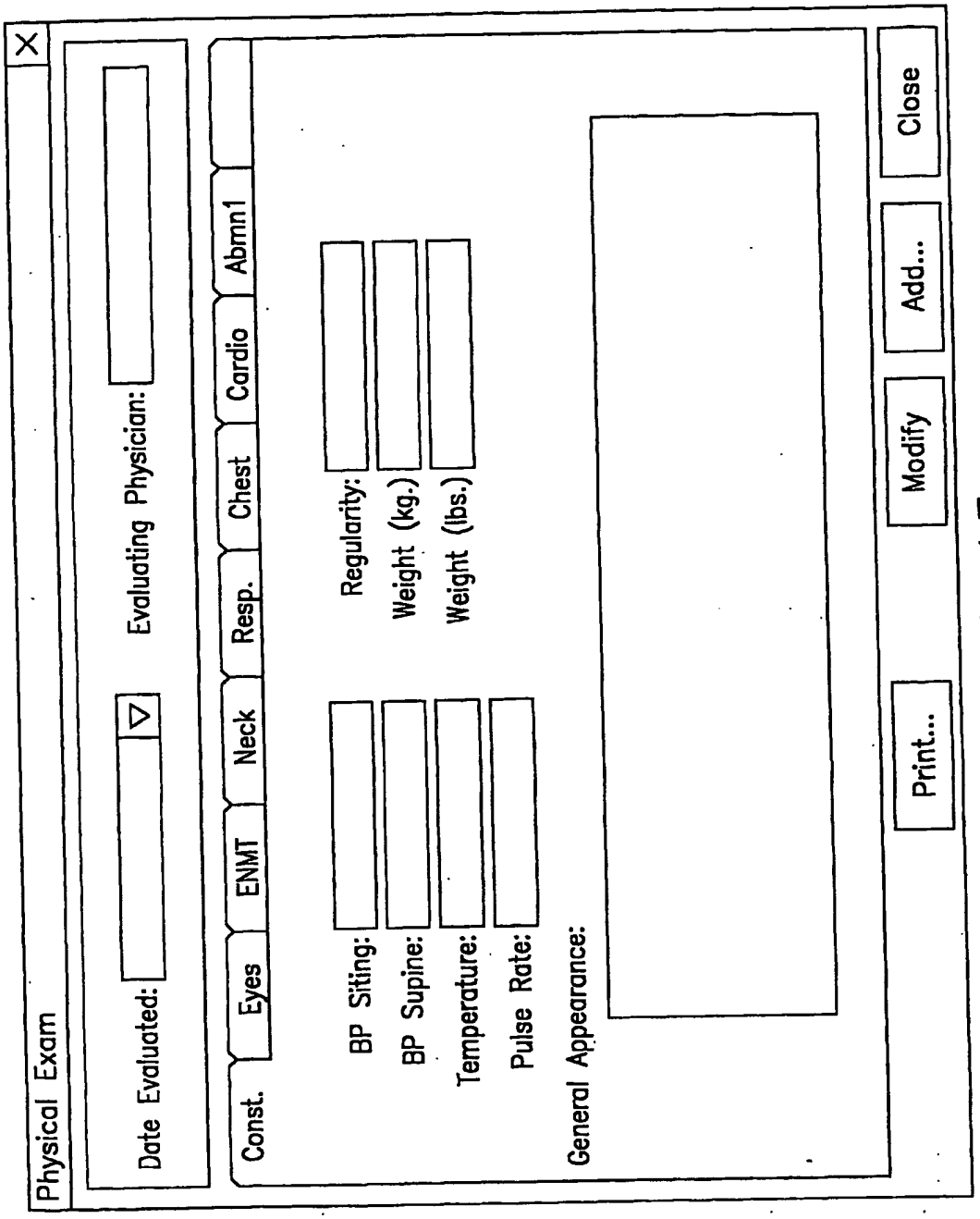

Physical Exam
Date Evaluated:
Evaluating Physician:
Const.
Eyes
ENMT
Neck
Resp.
Chest
Cardio
Abmn1
BP Siting:
BP Supine:
Temperature:
Pulse Rate:
Regularity:
Weight (kg.)
Weight (lbs.)
General Appearance:
Print...
Modify
Add...
Close

FIG-15

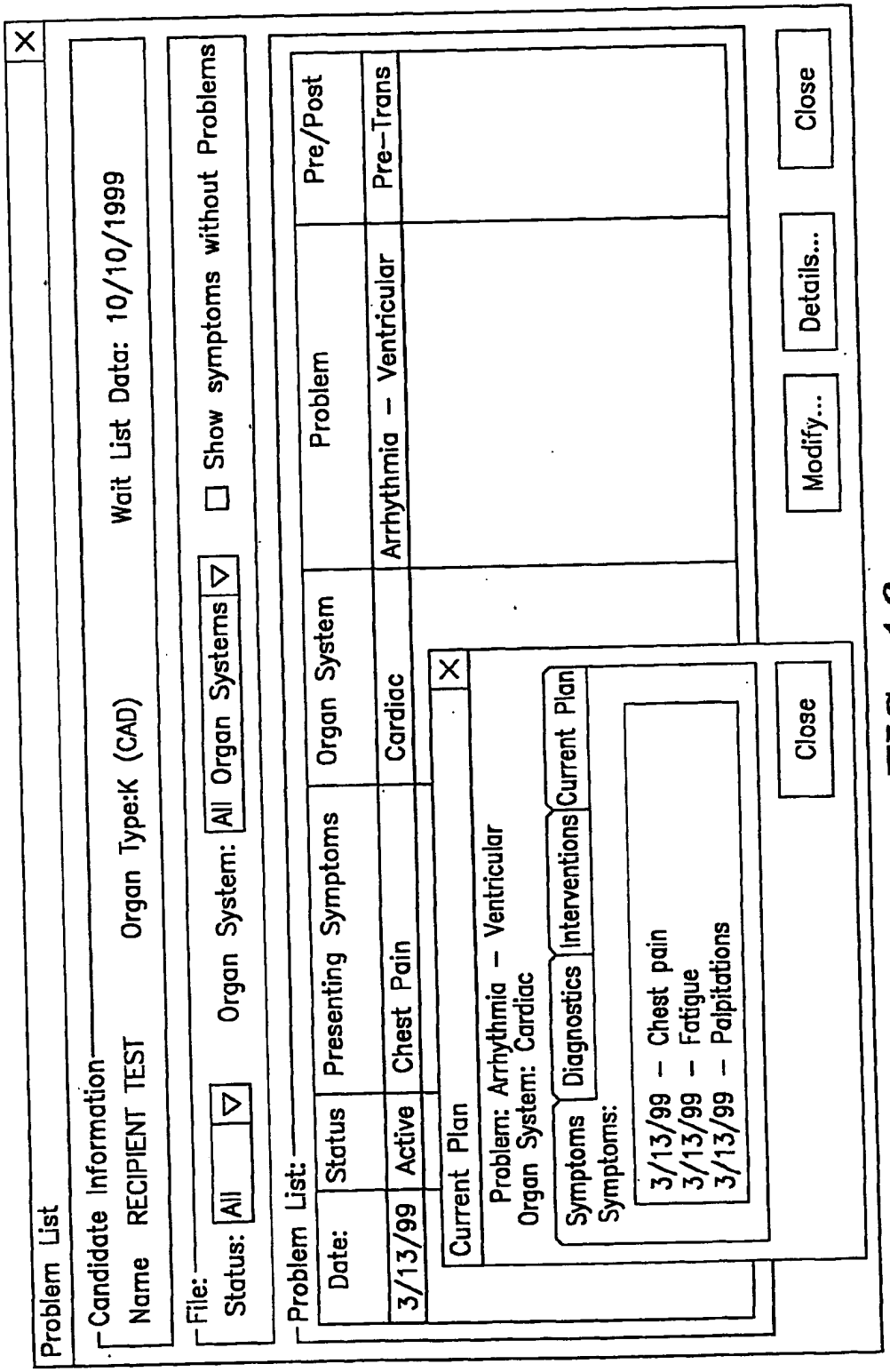

Problem List
Candidate Information
Name RECIPIENT TEST
Organ Type:K (CAD)
Wait List Data: 10/10/1999
File:
Status: All
Organ System: All Organ Systems
Show symptoms without Problems
Problem List:
Date:
Status
Presenting Symptoms
Organ System
Problem
Pre/Post
Pre-Trans
3/13/99
Active
Chest Pain
Cardiac
Arrhythmia - Ventricular
Current Plan
Problem: Arrhythmia - Ventricular
Organ System: Cardiac
Symptoms
Diagnostics
Interventions
Current Plan
Symptoms:
3/13/99 - Chest pain
3/13/99 - Fatigue
3/13/99 - Palpitations
Close
Modify...
Details...
Close

FIG-16

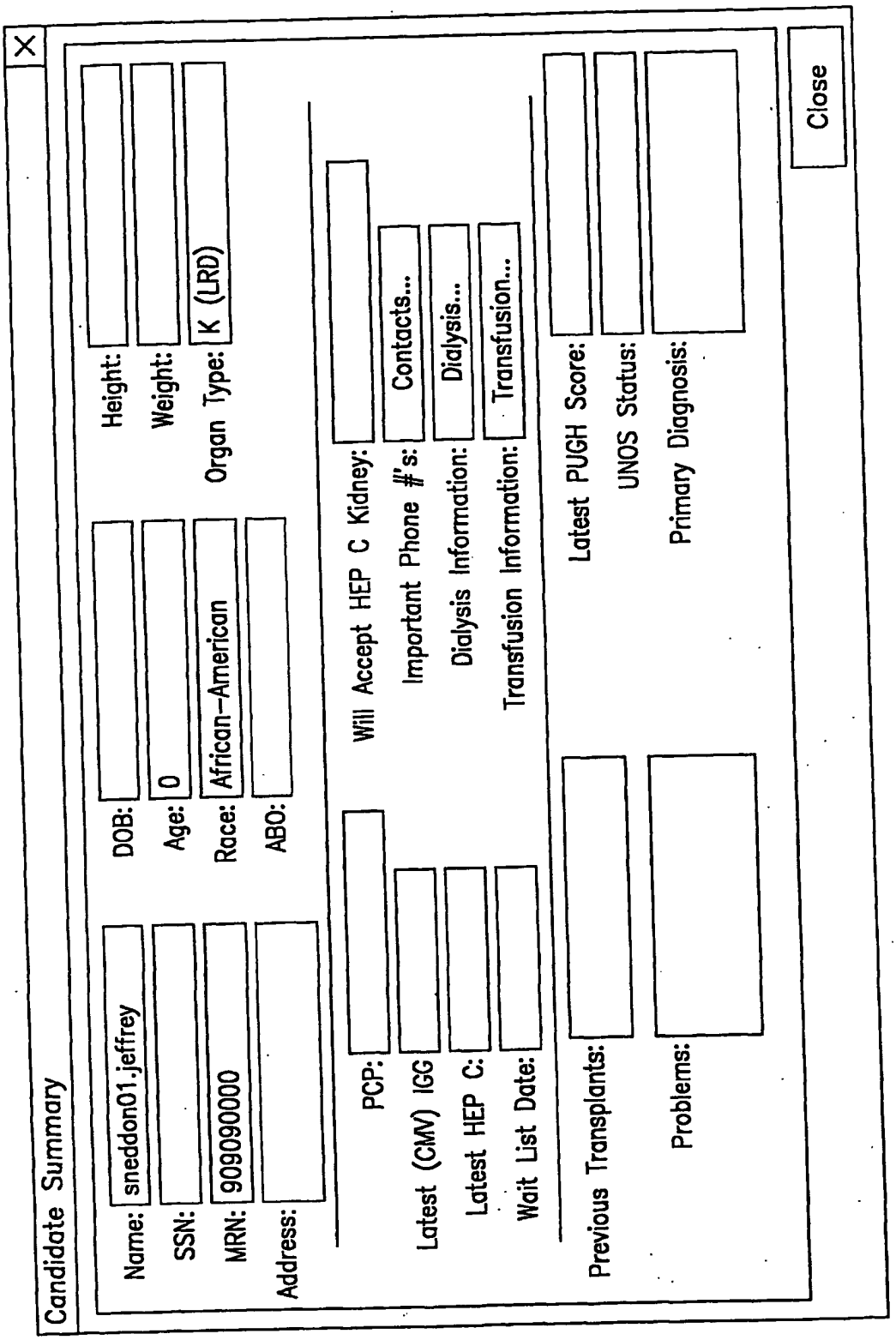
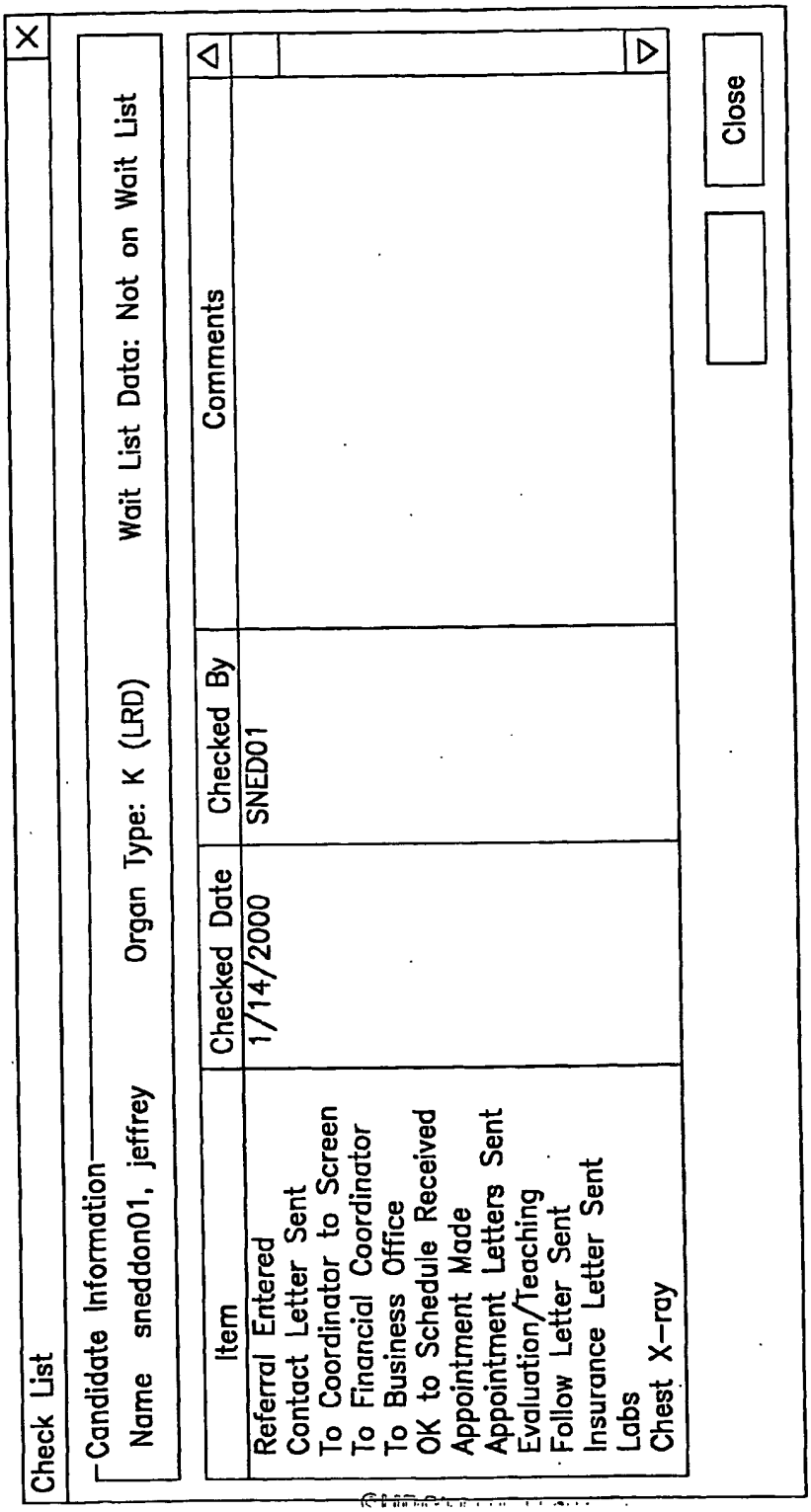

Candidate Summary
Name: sneddon01.jeffrey
SSN:
MRN: 909090000
Address:
DOB:
Age: 0
Race: African-American
ABO:
Height:
Weight:
Organ Type: K (LRD)
PCP:
Latest (CMV) IGG
Latest HEP C:
Wait List Date:
Will Accept HEP C Kidney:
Important Phone #'s:
Contacts...
Dialysis Information:
Dialysis...
Transfusion Information:
Transfusion...
Previous Transplants:
Problems:
Latest PUGH Score:
UNOS Status:
Primary Diagnosis:
Close

FIG-17

16/40


Check List
Candidate Information
Name sneddon01, jeffrey
Organ Type: K (LRD)
Wait List Data: Not on Wait List
Item
Checked Date
Checked By
Comments
Referral Entered
Contact Letter Sent
To Coordinator to Screen
To Financial Coordinator
To Business Office
OK to Schedule Received
Appointment Made
Appointment Letters Sent
Evaluation/Teaching
Follow Letter Sent
Insurance Letter Sent
Labs
Chest X-ray
1/14/2000
SNED01
Close

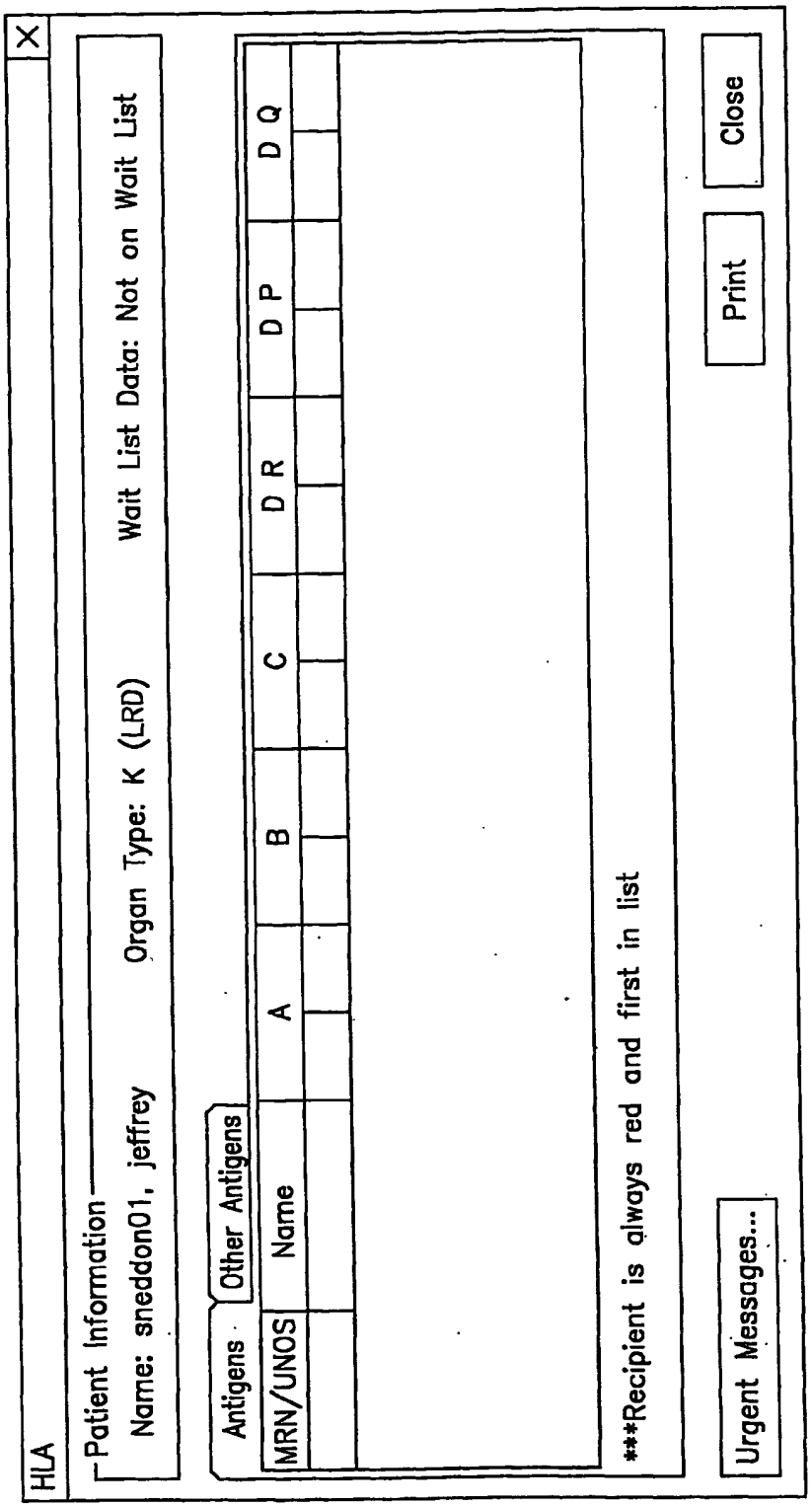

HLA
Patient Information
Name: sneddon01, jeffrey
Organ Type: K (LRD)
Wait List Data: Not on Wait List
Antigens
Other Antigens
MRN/UNOS
Name
A
B
C
D R
D P
D Q
***Recipient is always red and first in list
Urgent Messages...
Print
Close

FIG-19

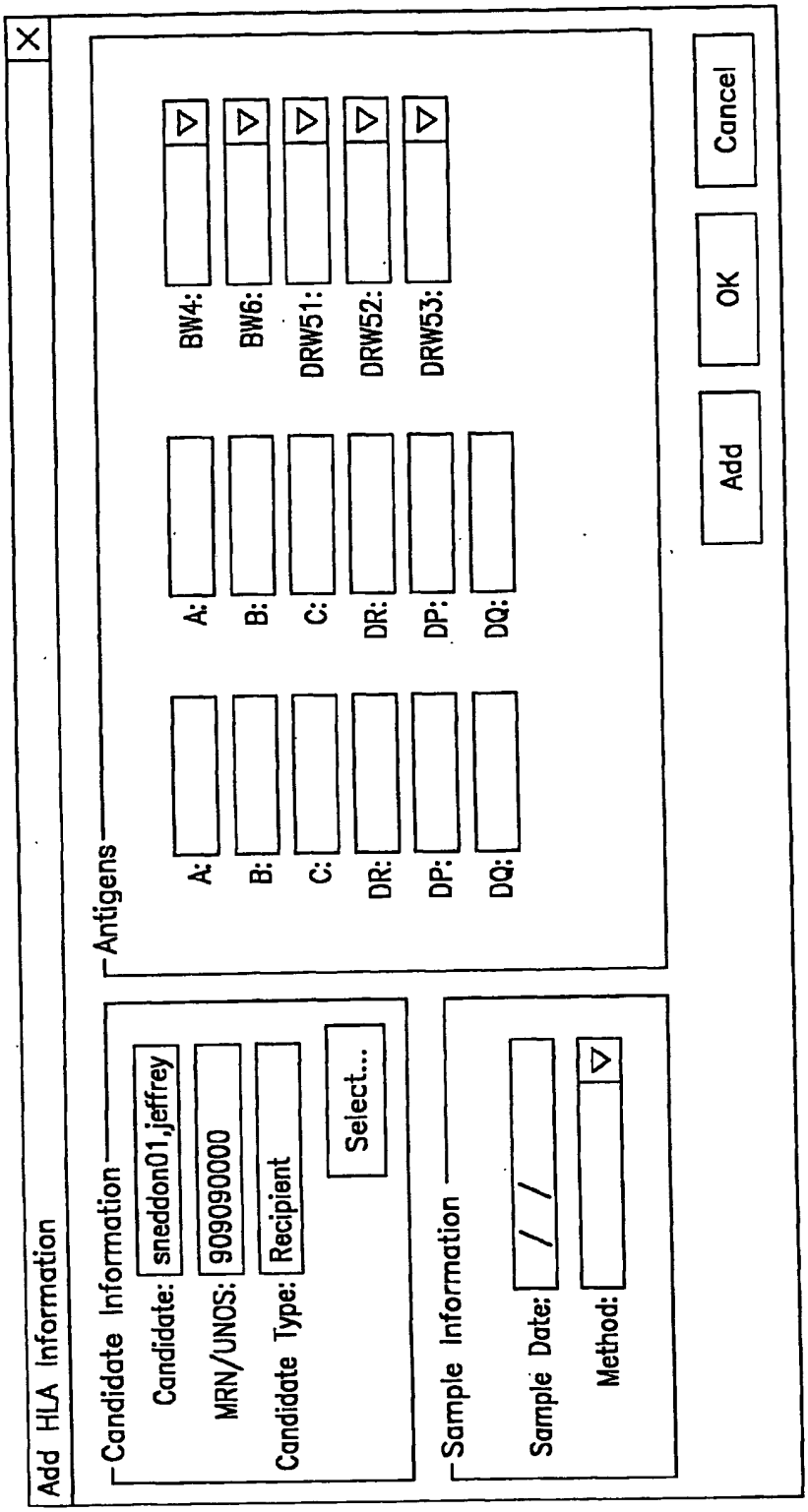

Add HLA Information
Candidate Information
Candidate: sneddon01,jeffrey
MRN/UNOS: 909090000
Candidate Type: Recipient
Select...
Sample Information
Sample Date: / /
Method:
Antigens
A:
B:
C:
DR:
DP:
DQ:
A:
B:
C:
DR:
DP:
DQ:
BW4:
BW6:
DRW51:
DRW52:
DRW53:
Add
OK
Cancel

FIG-20

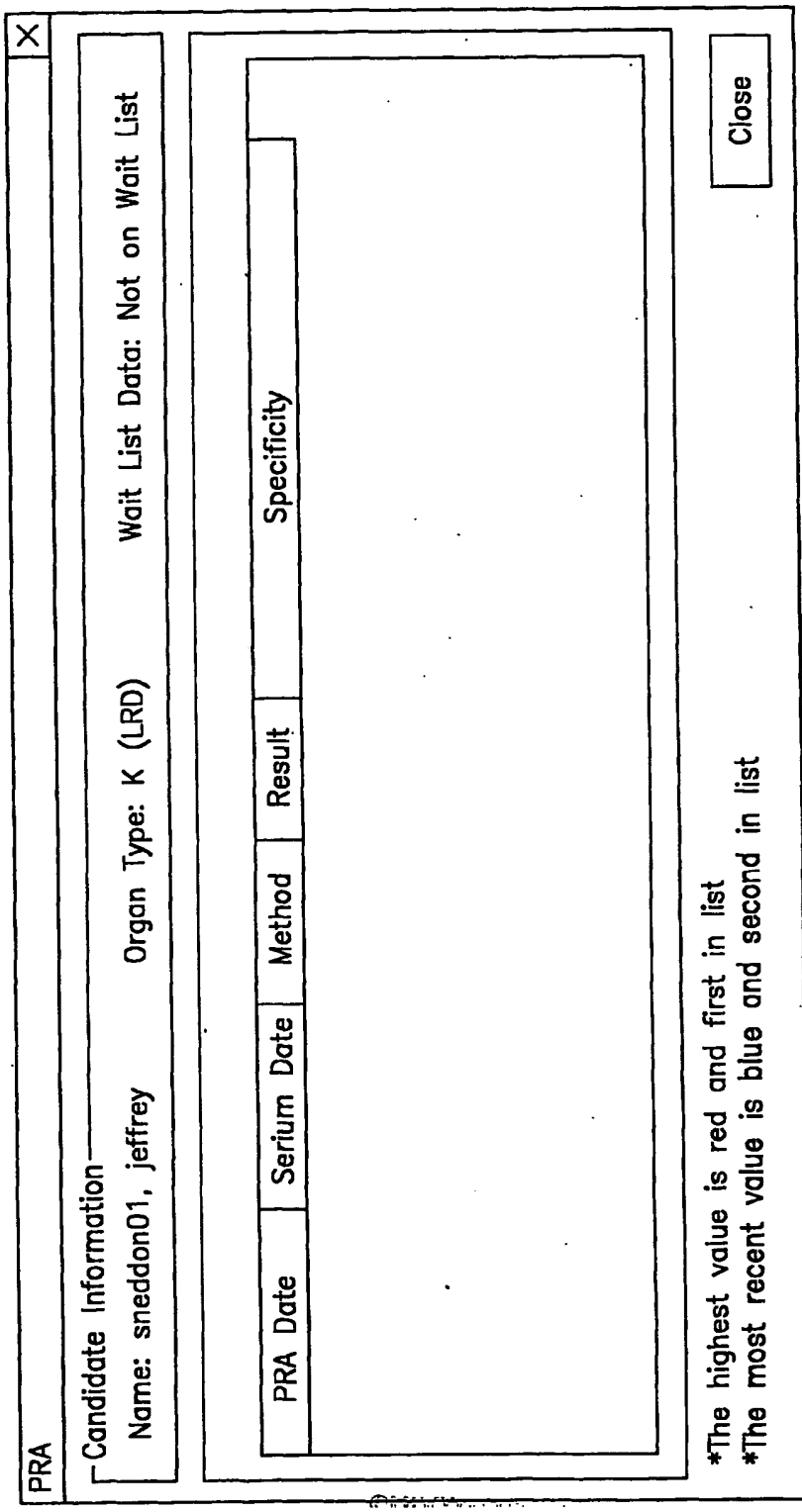

PRA
Candidate Information
Name: sneddon01, jeffrey
Organ Type: K (LRD)
Wait List Data: Not on Wait List
PRA Date
Serium Date
Method
Result
Specificity
Close
*The highest value is red and first in list
*The most recent value is blue and second in list

FIG-21

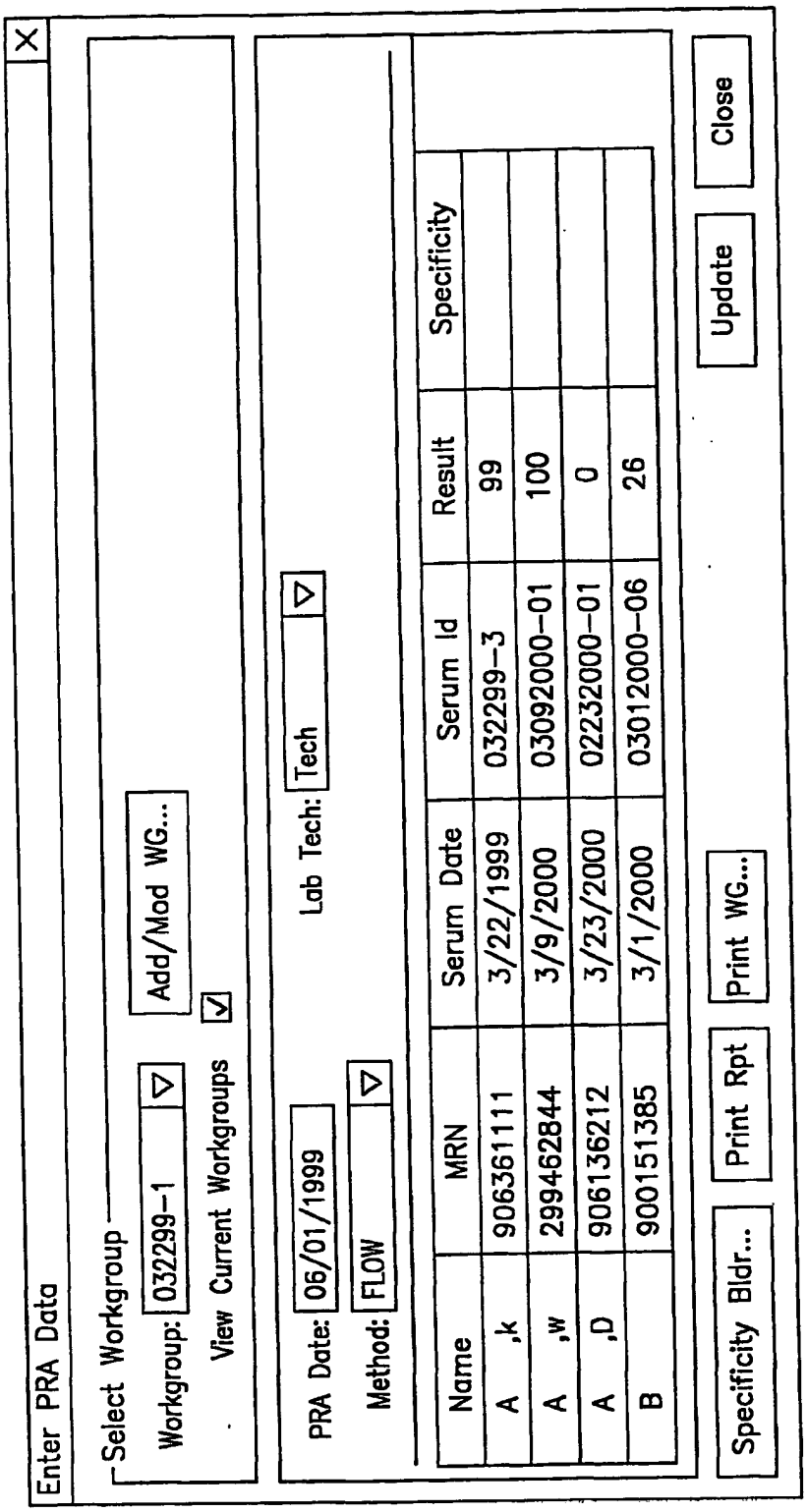

Enter PRA Data
Select Workgroup
Workgroup: 032299-1
Add/Mod WG...
View Current Workgroups
PRA Date: 06/01/1999
Lab Tech: Tech
Method: FLOW
Name
MRN
Serum Date
Serum Id
Result
Specificity
A ,k
906361111
3/22/1999
032299-3
99
A ,W
299462844
3/9/2000
03092000-01
100
A ,D
906136212
3/23/2000
02232000-01
0
B
900151385
3/1/2000
03012000-06
26
Specificity Bldr...
Print Rpt
Print WG...
Update
Close

FIG-22

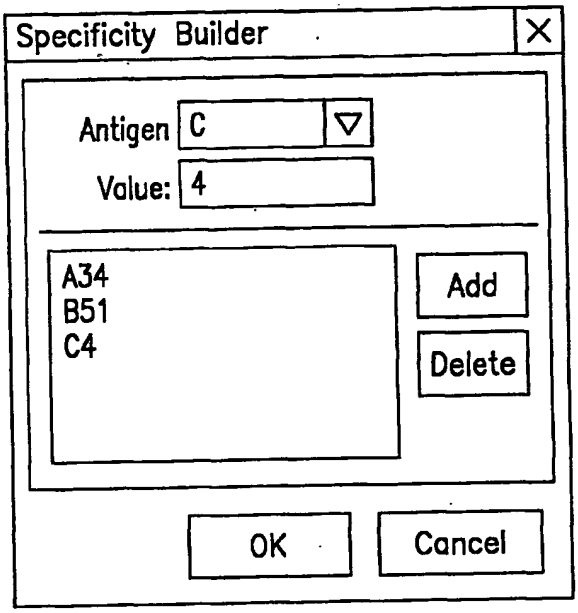

Specificity Builder
Antigen C
Value: 4
A34
B51
C4
Add
Delete
OK
Cancel

FIG-23

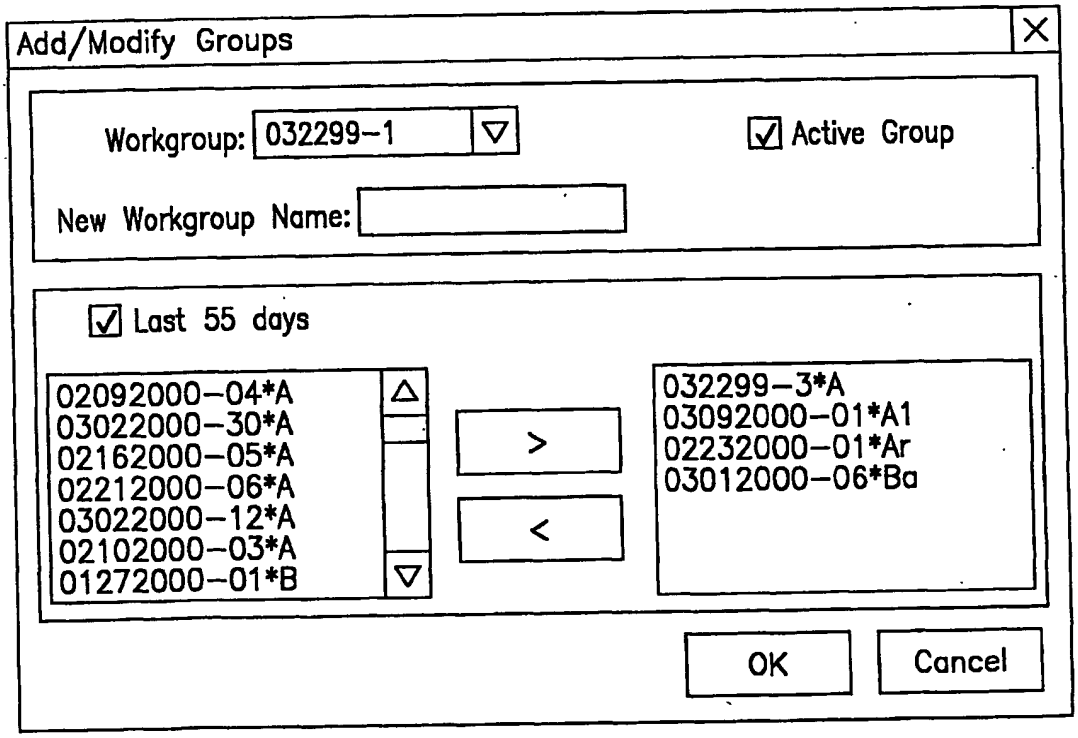

Add/Modify Groups
Workgroup: 032299-1
Active Group
New Workgroup Name:
Last 55 days
02092000-04*A
03022000-30*A
02162000-05*A
02212000-06*A
03022000-12*A
02102000-03*A
01272000-01*B
>
<
032299-3*A
03092000-01*A1
02232000-01*Ar
03012000-06*Ba
OK
Cancel

FIG-24

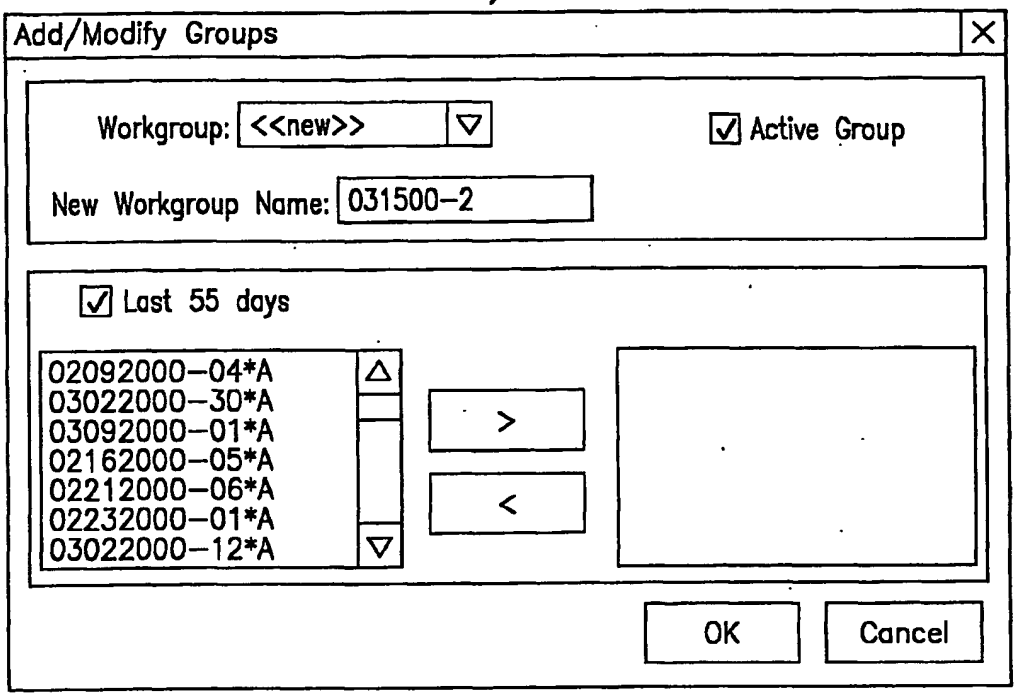

Add/Modify Groups
Workgroup: <<new>>
Active Group
New Workgroup Name: 031500-2
Last 55 days
02092000-04*A
03022000-30*A
03092000-01*A
02162000-05*A
02212000-06*A
02232000-01*A
03022000-12*A
>
<
OK
Cancel

FIG-25

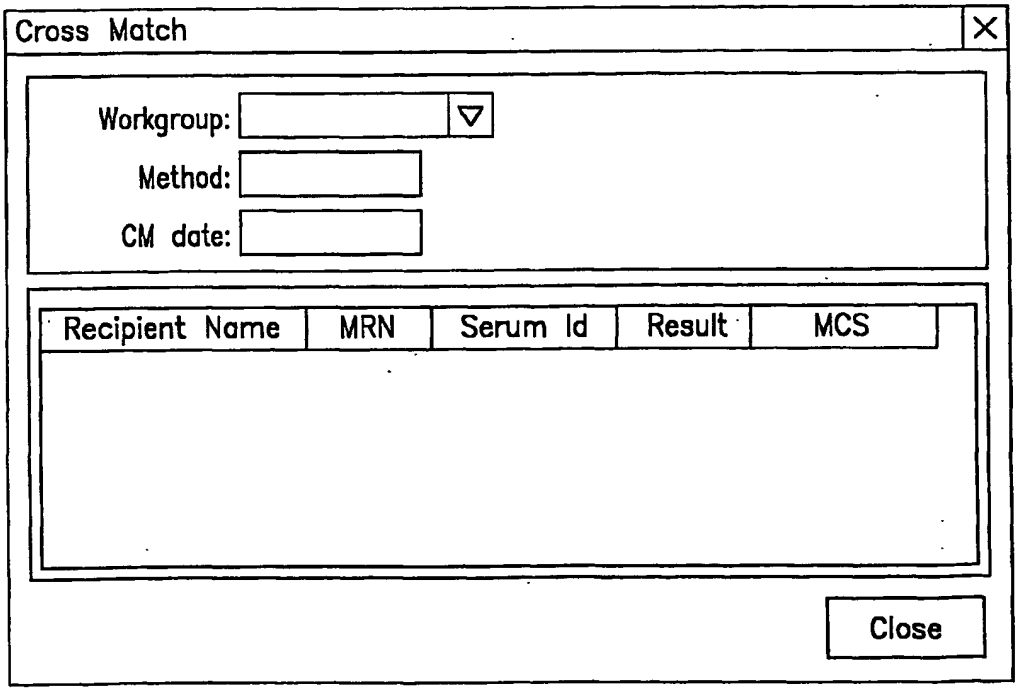

Cross Match
Workgroup:
Method:
CM date:
Recipient Name
MRN
Serum Id
Result
MCS
Close

FIG-26

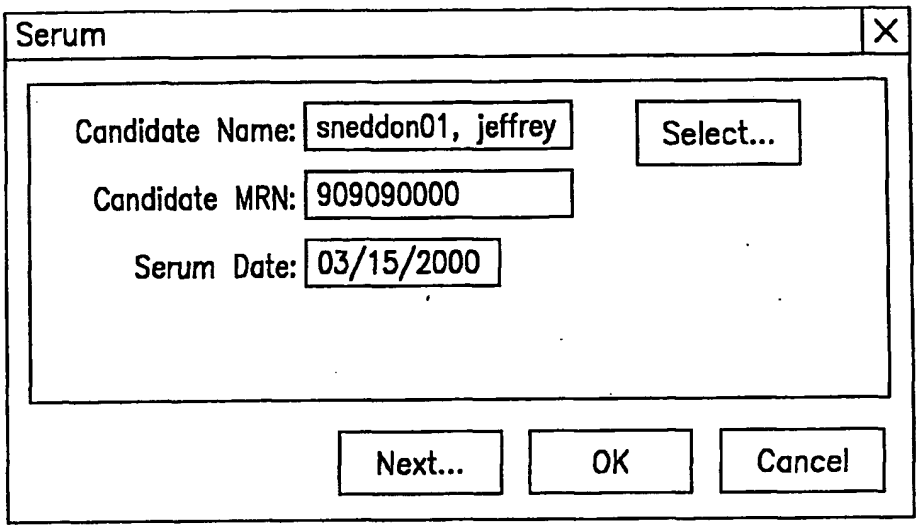

Serum
Candidate Name: sneddon01, jeffrey
Select...
Candidate MRN: 909090000
Serum Date: 03/15/2000
Next...
OK
Cancel

FIG-27

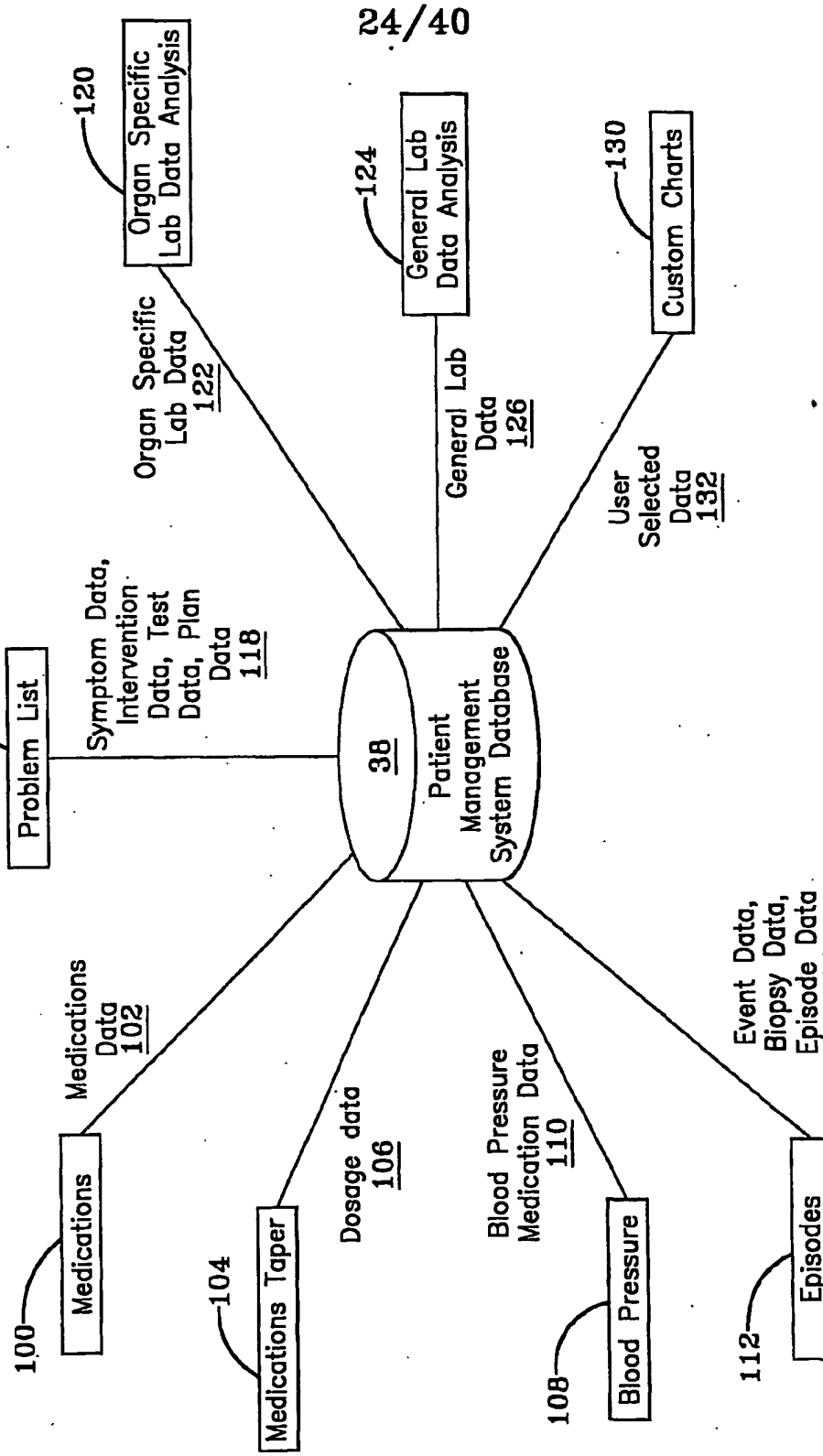

Patient Management System Database
38
Problem List
116
Symptom Data, Intervention Data, Test Data, Plan Data 118
Organ Specific Lab Data Analysis
120
Organ Specific Lab Data 122
General Lab Data Analysis
124
General Lab Data 126
Custom Charts
130
User Selected Data 132
Medications
100
Medications Data 102
Medications Taper
104
Dosage data 106
Blood Pressure
108
Blood Pressure Medication Data 110
Episodes
112
Event Data, Biopsy Data, Episode Data 114

FIG-28

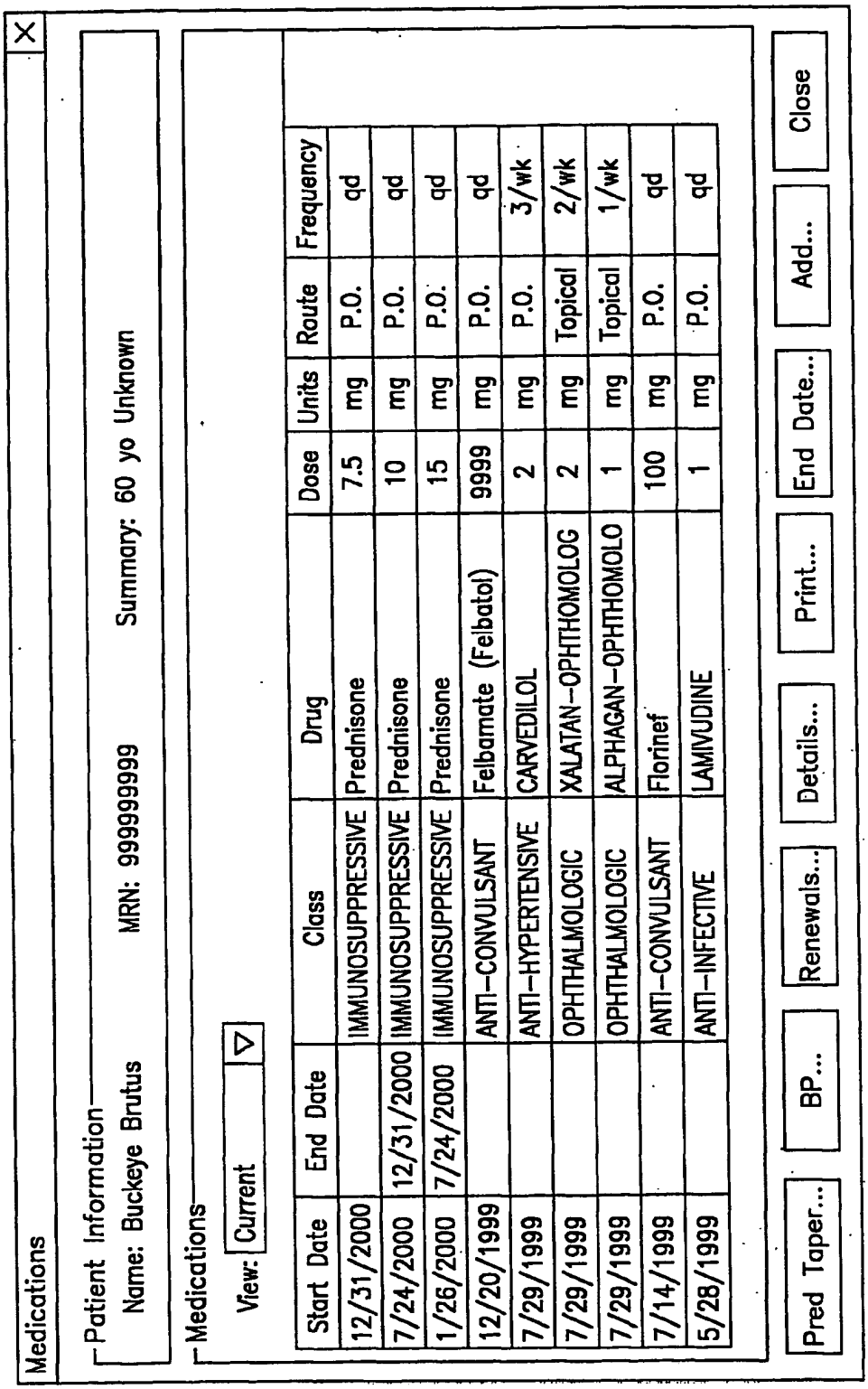
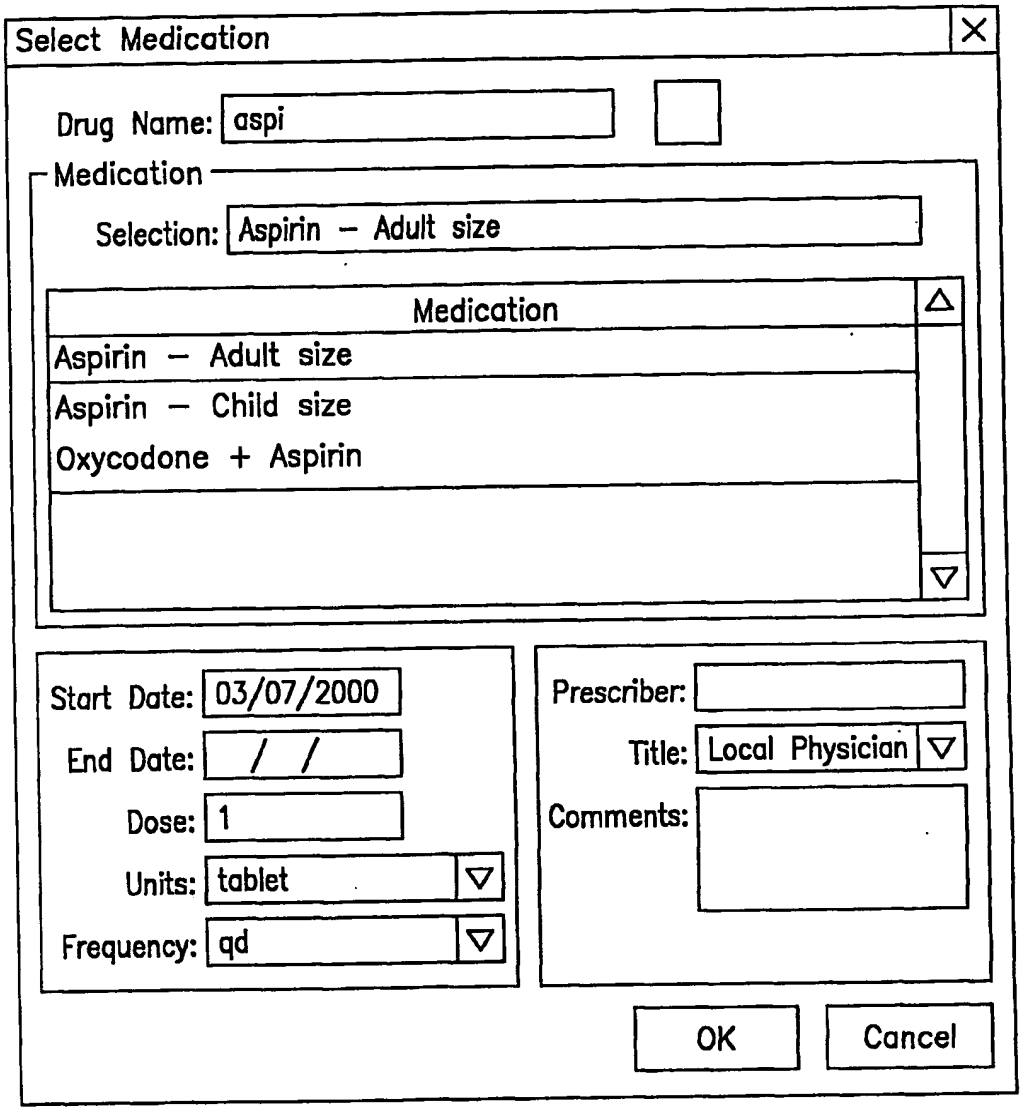
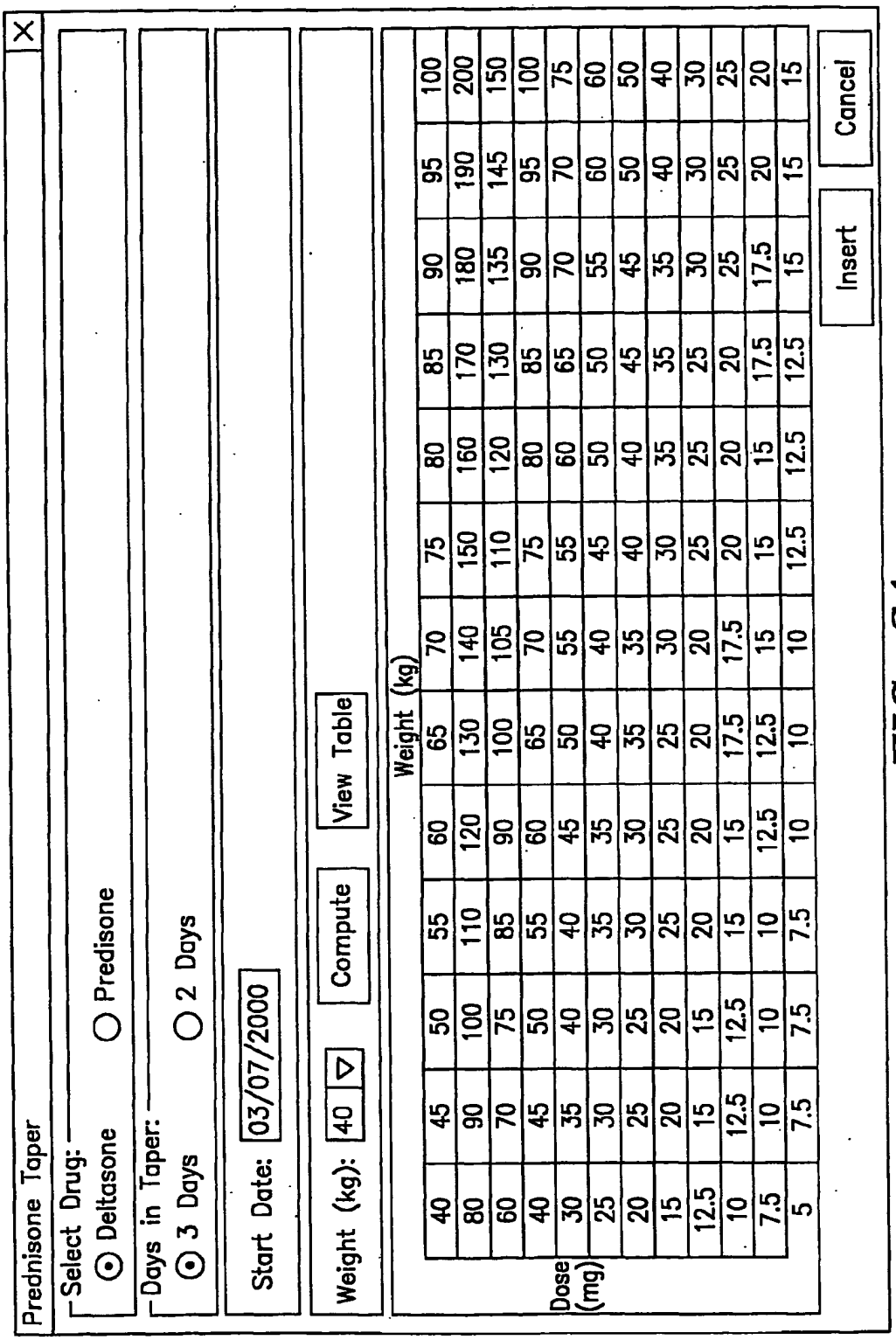

Medications
Patient Information
Name: Buckeye Brutus
MRN: 999999999
Summary: 60 yo Unknown
Medications
View: Current
Start Date | End Date | Class | Drug | Dose | Units | Route | Frequency
12/31/2000 | | IMMUNOSUPPRESSIVE | Prednisone | 7.5 | mg | P.O. | qd
7/24/2000 | 12/31/2000 | IMMUNOSUPPRESSIVE | Prednisone | 10 | mg | P.O. | qd
1/26/2000 | 7/24/2000 | IMMUNOSUPPRESSIVE | Prednisone | 15 | mg | P.O. | qd
12/20/1999 | | ANTI-CONVULSANT | Felbamate (Felbatol) | 9999 | mg | P.O. | qd
7/29/1999 | | ANTI-HYPERTENSIVE | CARVEDILOL | 2 | mg | P.O. | 3/wk
7/29/1999 | | OPHTHALMOLOGIC | XALATAN-OPHTHOMOLOG | 2 | mg | Topical | 2/wk
7/29/1999 | | OPHTHALMOLOGIC | ALPHAGAN-OPHTHOMOLO | 1 | mg | Topical | 1/wk
7/14/1999 | | ANTI-CONVULSANT | Florinef | 100 | mg | P.O. | qd
5/28/1999 | | ANTI-INFECTIVE | LAMIVUDINE | 1 | mg | P.O. | qd
Pred Taper...
BP...
Renewals...
Details...
Print...
End Date...
Add...
Close

FIG-29


Select Medication
Drug Name: aspi
Medication
Selection: Aspirin – Adult size
Medication
Aspirin – Adult size
Aspirin – Child size
Oxycodone + Aspirin
Start Date: 03/07/2000
End Date: / /
Dose: 1
Units: tablet
Frequency: qd
Prescriber:
Title: Local Physician
Comments:
OK
Cancel

FIG–30



Dose (mg)	45	50	55	60	65	70	75	80	85	90	95	100
40	45	50	55	60	65	70	75	80	85	90	95	100
80	90	100	110	120	130	140	150	160	170	180	190	200
60	70	75	85	90	100	105	110	120	130	135	145	150
40	45	50	55	60	65	70	75	80	85	90	95	100
30	35	40	40	45	50	55	55	60	65	70	70	75
25	30	30	35	35	40	40	45	50	50	55	60	60
20	25	25	30	30	35	35	40	40	45	45	50	50
15	20	20	25	25	25	30	30	35	35	35	40	40
12.5	15	15	20	20	20	20	25	25	25	30	30	30
10	12.5	12.5	15	15	17.5	17.5	20	20	20	25	25	25
7.5	10	10	10	12.5	12.5	15	15	15	17.5	17.5	20	20
5	7.5	7.5	7.5	10	10	10	12.5	12.5	12.5	15	15	15

FIG-31

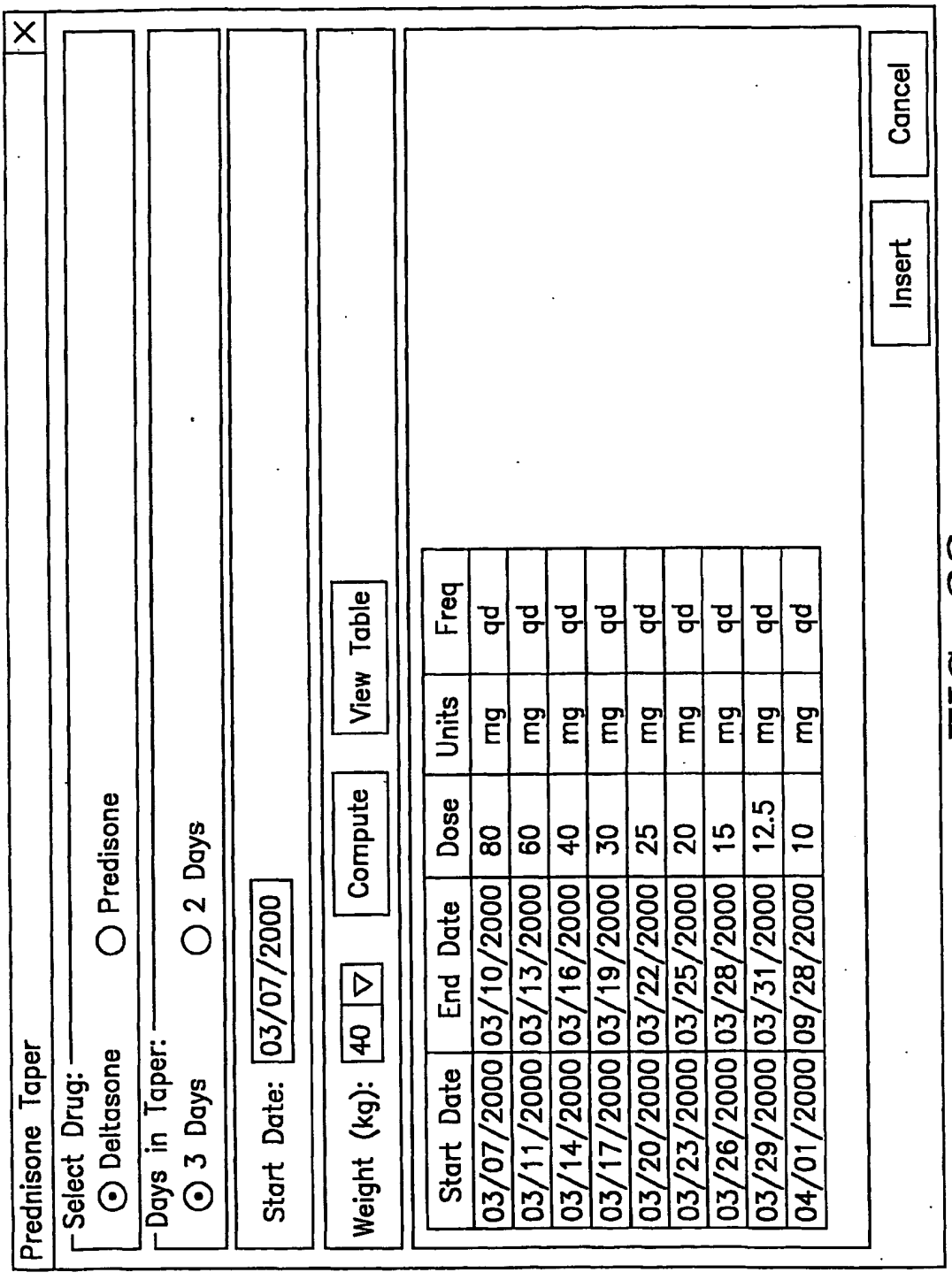

Prednisone Taper
Select Drug:
Deltasone
Predisone
Days in Taper:
3 Days
2 Days
Start Date: 03/07/2000
Weight (kg): 40
Compute
View Table
Start Date | End Date | Dose | Units | Freq
03/07/2000 | 03/10/2000 | 80 | mg | qd
03/11/2000 | 03/13/2000 | 60 | mg | qd
03/14/2000 | 03/16/2000 | 40 | mg | qd
03/17/2000 | 03/19/2000 | 30 | mg | qd
03/20/2000 | 03/22/2000 | 25 | mg | qd
03/23/2000 | 03/25/2000 | 20 | mg | qd
03/26/2000 | 03/28/2000 | 15 | mg | qd
03/29/2000 | 03/31/2000 | 12.5 | mg | qd
04/01/2000 | 09/28/2000 | 10 | mg | qd
Insert
Cancel

FIG-32

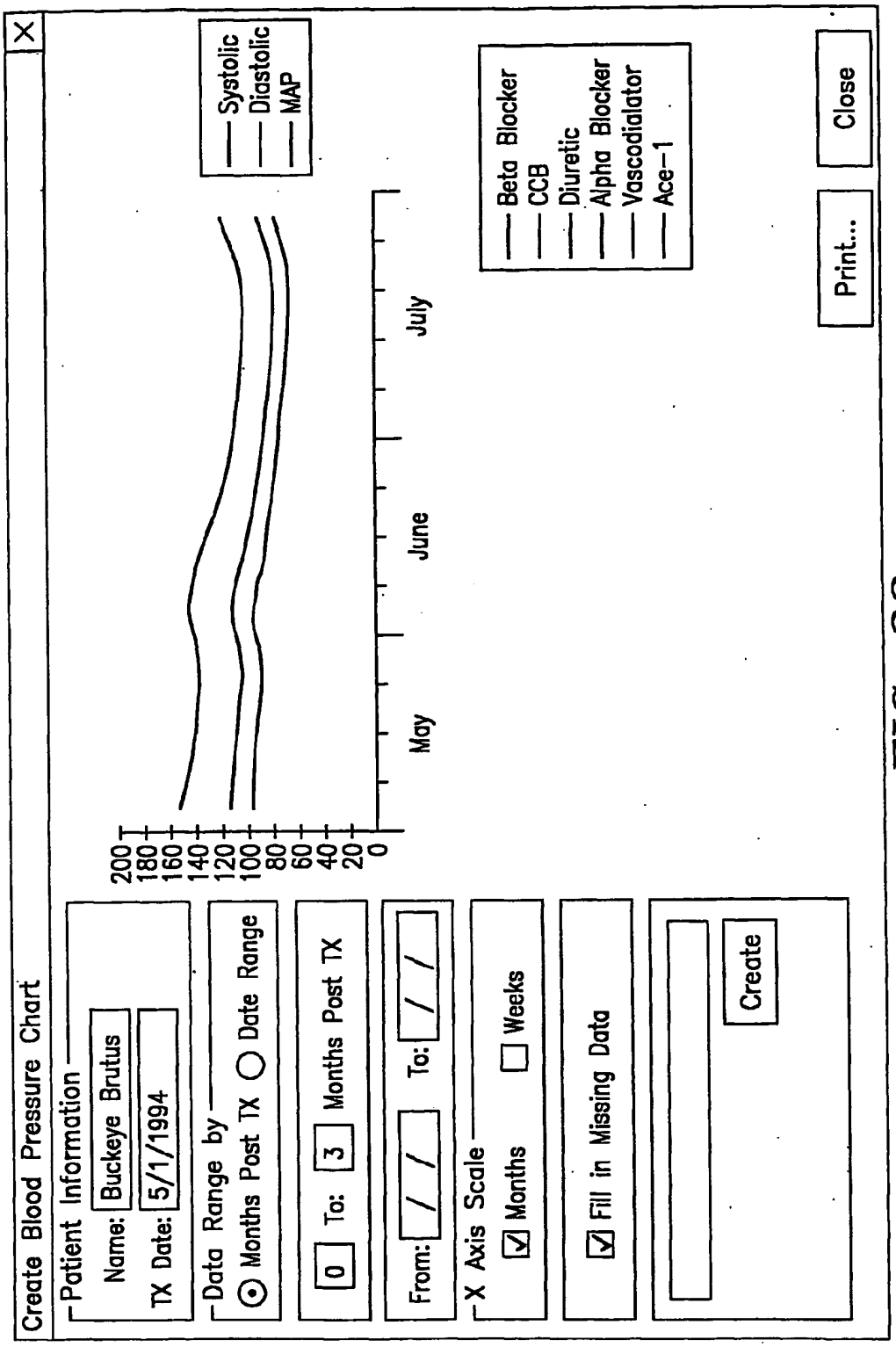

Create Blood Pressure Chart
Patient Information
Name: Buckeye Brutus
TX Date: 5/1/1994
Data Range by
Months Post TX
Date Range
0 To: 3 Months Post TX
From: / / To: / /
X Axis Scale
Months
Weeks
Fill in Missing Data
Create
200
180
160
140
120
100
80
60
40
20
0
May
June
July
Systolic
Diastolic
MAP
Beta Blocker
CCB
Diuretic
Alpha Blocker
Vascodialator
Ace-1
Print...
Close

FIG-33

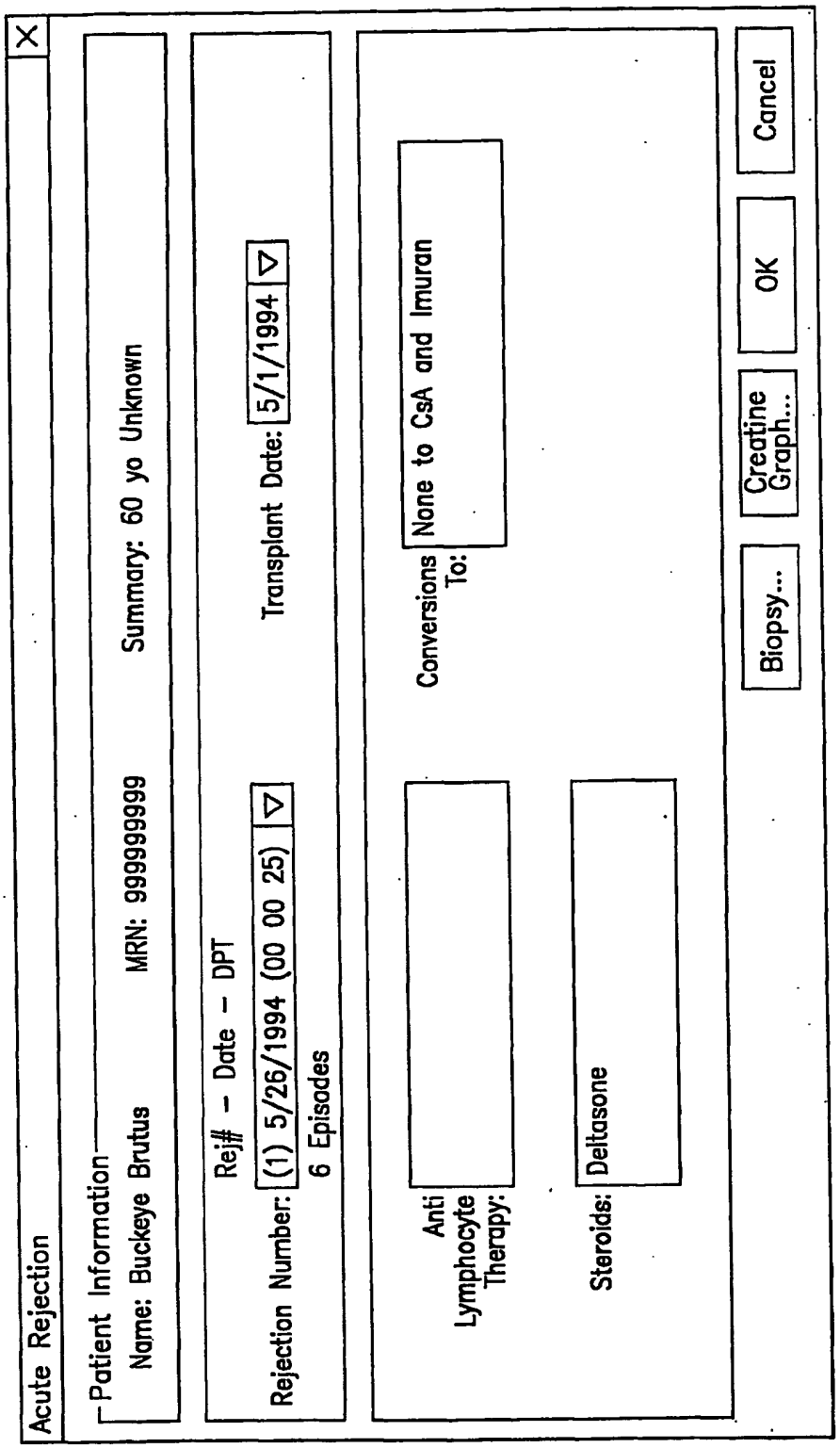

Acute Rejection
Patient Information
Name: Buckeye Brutus
MRN: 999999999
Summary: 60 yo Unknown
Rej# - Date - DPT
Rejection Number: (1) 5/26/1994 (00 00 25)
6 Episodes
Transplant Date: 5/1/1994
Anti Lymphocyte Therapy:
Steroids: Deltasone
Conversions To: None to CsA and Imuran
Biopsy...
Creatine Graph...
OK
Cancel

FIG-34

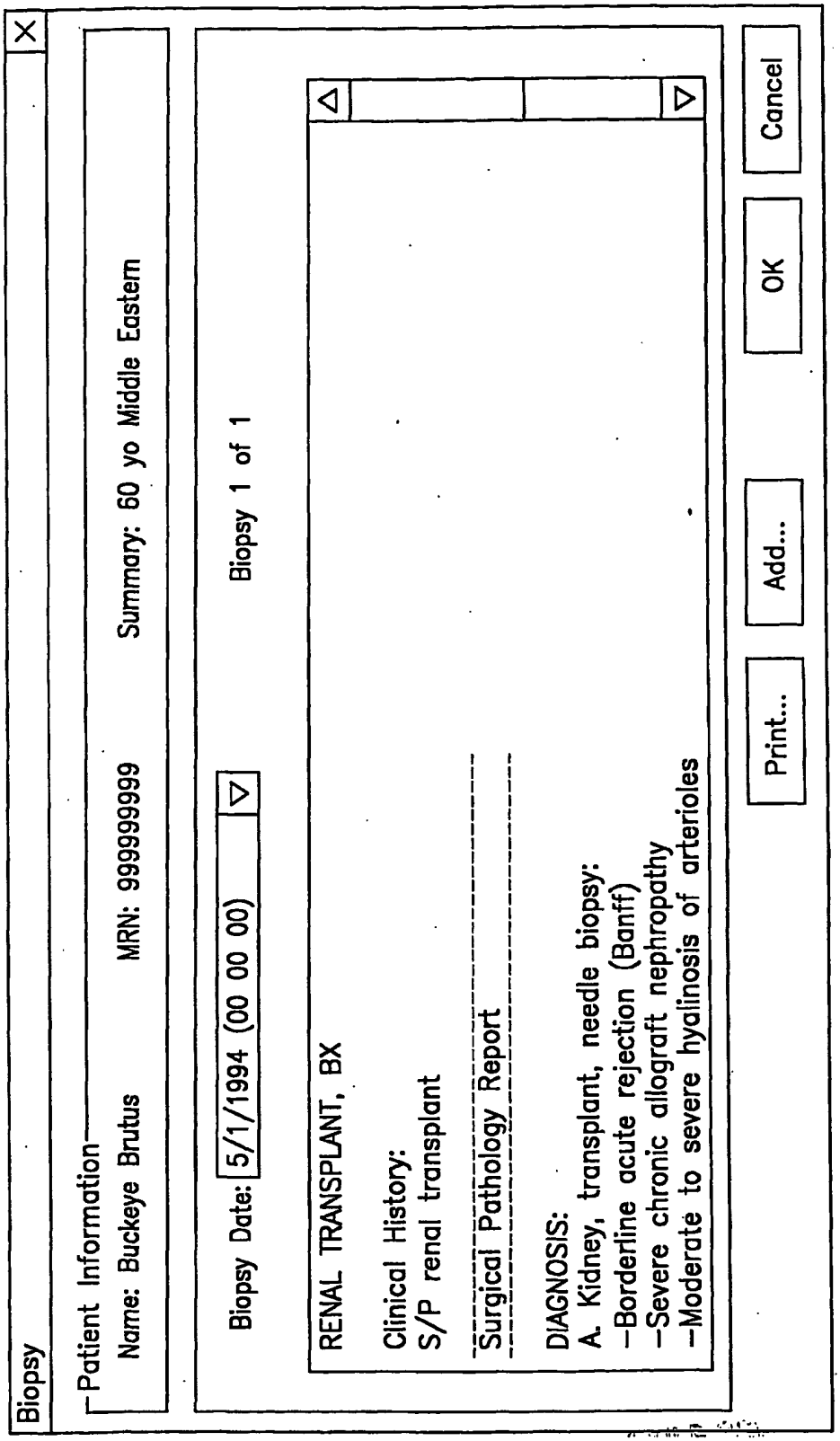

Biopsy
Patient Information
Name: Buckeye Brutus
MRN: 99999999
Summary: 60 yo Middle Eastern
Biopsy Date: 5/1/1994 (00 00 00)
Biopsy 1 of 1
RENAL TRANSPLANT, BX
Clinical History:
S/P renal transplant
Surgical Pathology Report
DIAGNOSIS:
A. Kidney, transplant, needle biopsy:
-Borderline acute rejection (Banff)
-Severe chronic allograft nephropathy
-Moderate to severe hyalinosis of arterioles
Print...
Add...
OK
Cancel

FIG-35

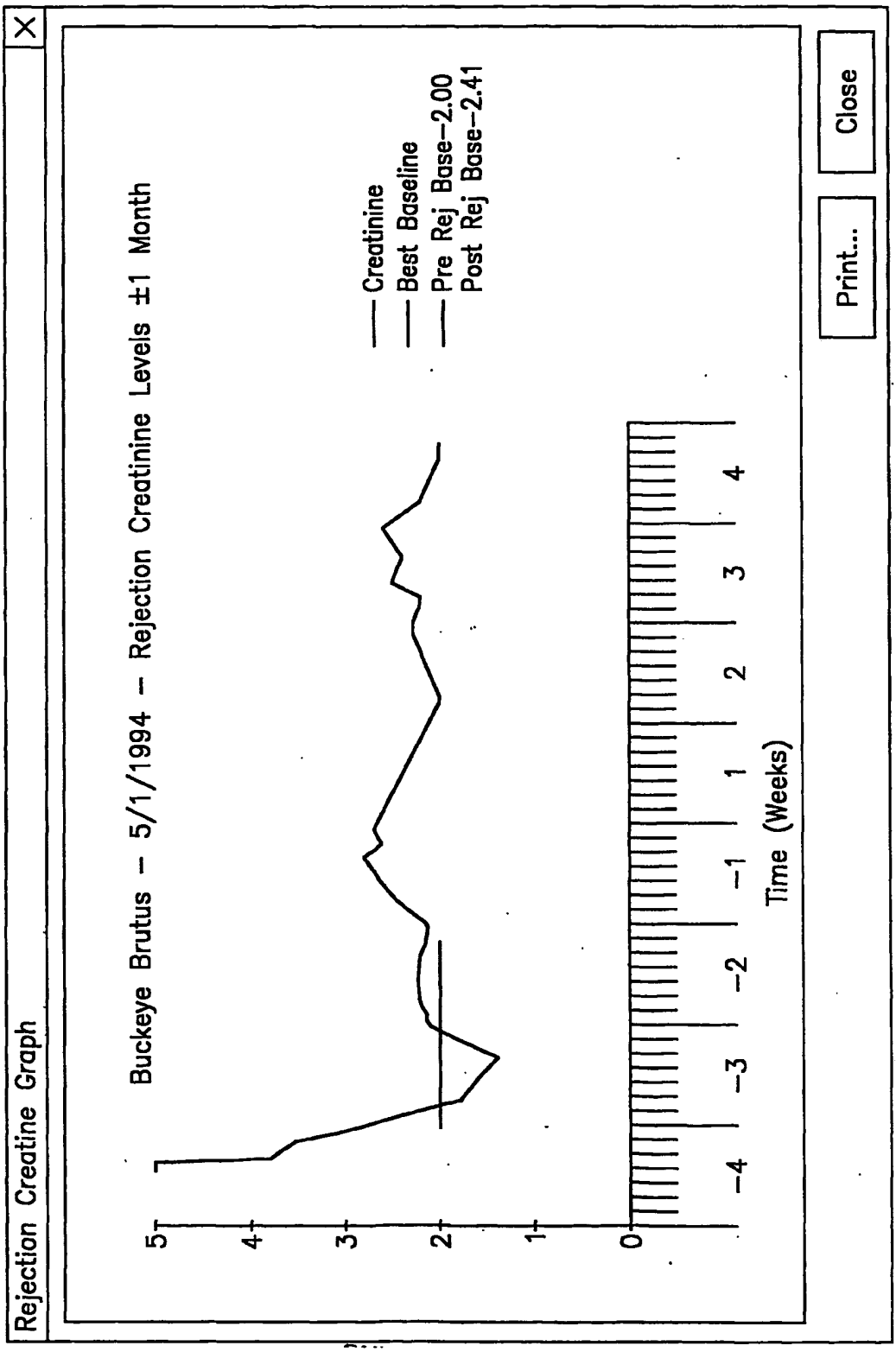

Rejection Creatine Graph
Buckeye Brutus - 5/1/1994 - Rejection Creatinine Levels ±1 Month
Creatinine
Best Baseline
Pre Rej Base=2.00
Post Rej Base=2.41
Time (Weeks)
5
4
3
2
1
0
-4
-3
-2
-1
1
2
3
4
Print...
Close

FIG-36

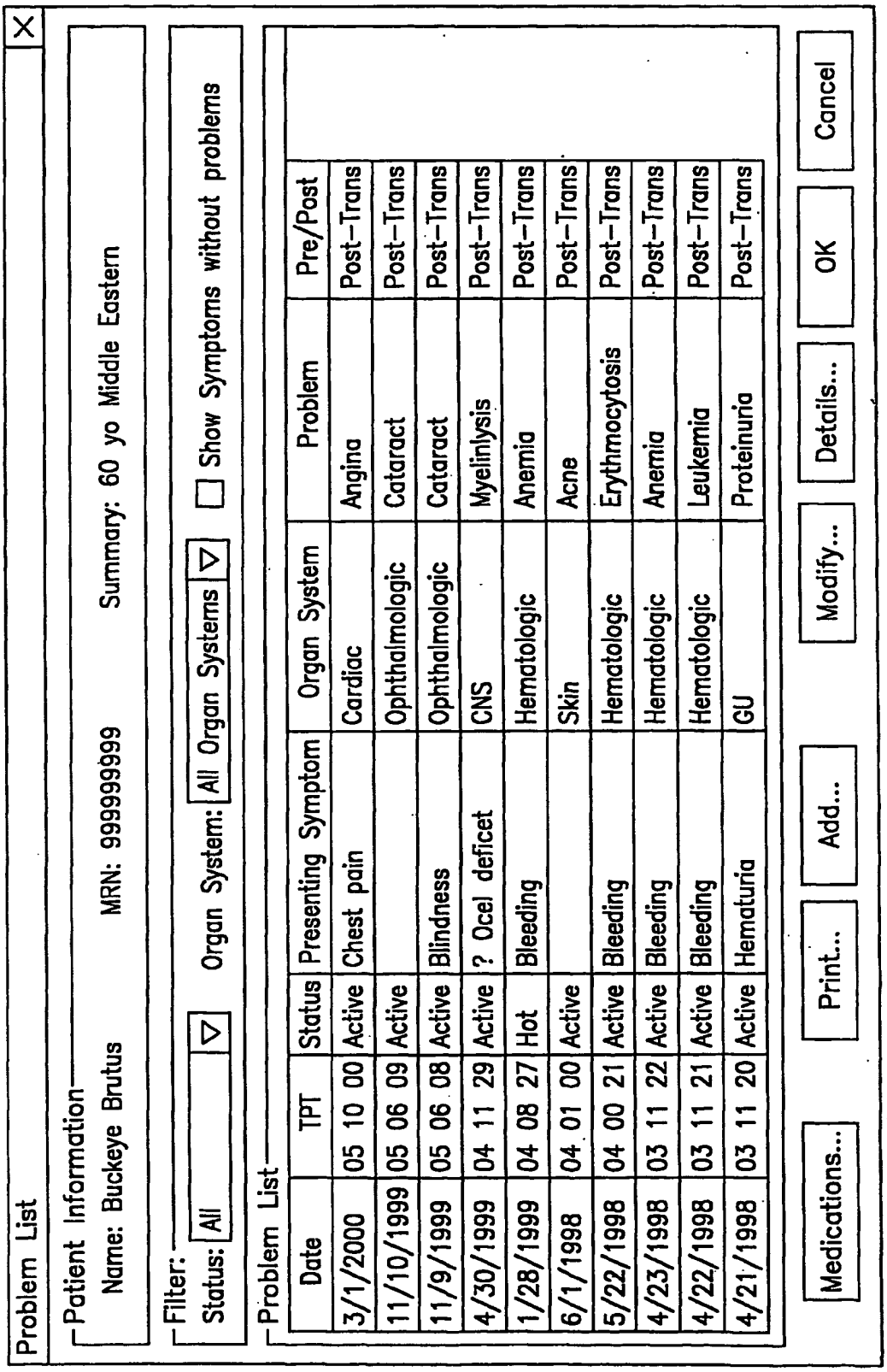

Problem List
Patient Information
Name: Buckeye Brutus
MRN: 99999999
Summary: 60 yo Middle Eastern
Filter:
Status: All
Organ System: All Organ Systems
Show Symptoms without problems
Problem List
Date | TPT | Status | Presenting Symptom | Organ System | Problem | Pre/Post
3/1/2000 | 05 10 00 | Active | Chest pain | Cardiac | Angina | Post-Trans
11/10/1999 | 05 06 09 | Active | | Ophthalmologic | Cataract | Post-Trans
11/9/1999 | 05 06 08 | Active | Blindness | Ophthalmologic | Cataract | Post-Trans
4/30/1999 | 04 11 29 | Active | ? Ocel deficet | CNS | Myelinlysis | Post-Trans
1/28/1999 | 04 08 27 | Hot | Bleeding | Hematologic | Anemia | Post-Trans
6/1/1998 | 04 01 00 | Active | | Skin | Acne | Post-Trans
5/22/1998 | 04 00 21 | Active | Bleeding | Hematologic | Erythmocytosis | Post-Trans
4/23/1998 | 03 11 22 | Active | Bleeding | Hematologic | Anemia | Post-Trans
4/22/1998 | 03 11 21 | Active | Bleeding | Hematologic | Leukemia | Post-Trans
4/21/1998 | 03 11 20 | Active | Hematuria | GU | Proteinuria | Post-Trans
Medications...
Print...
Add...
Modify...
Details...
OK
Cancel

FIG-37

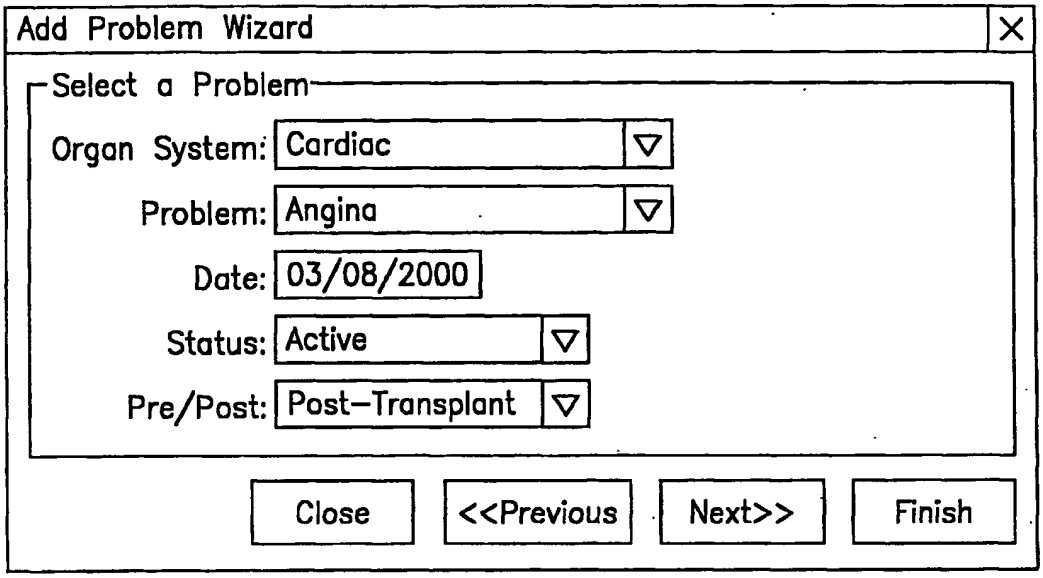

Add Problem Wizard
Select a Problem
Organ System: Cardiac
Problem: Angina
Date: 03/08/2000
Status: Active
Pre/Post: Post-Transplant
Close
<<Previous
Next>>
Finish

FIG-38

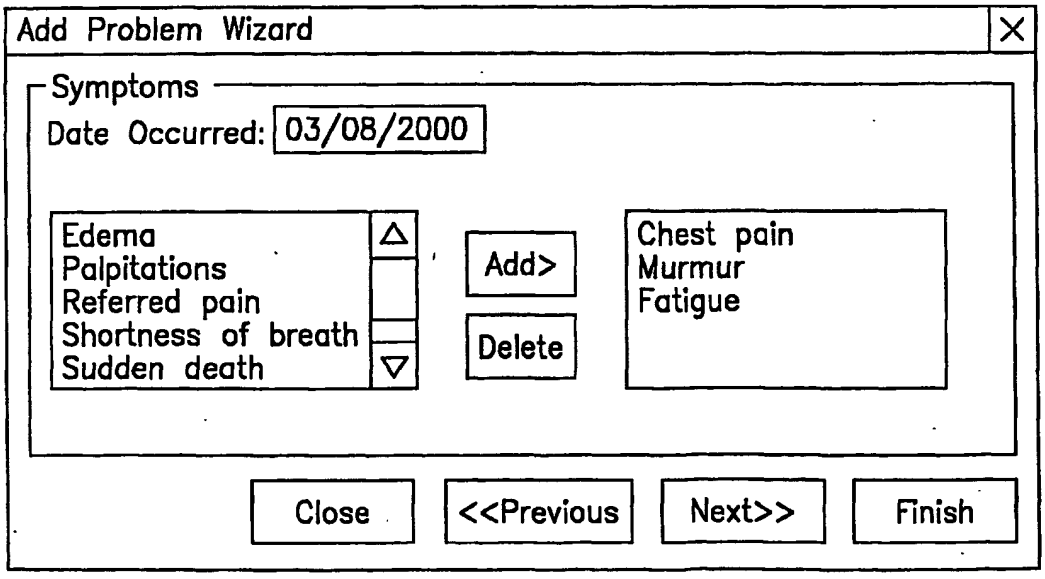

Add Problem Wizard
Symptoms
Date Occurred: 03/08/2000
Edema
Palpitations
Referred pain
Shortness of breath
Sudden death
Add>
Delete
Chest pain
Murmur
Fatigue
Close
<<Previous
Next>>
Finish

FIG-39

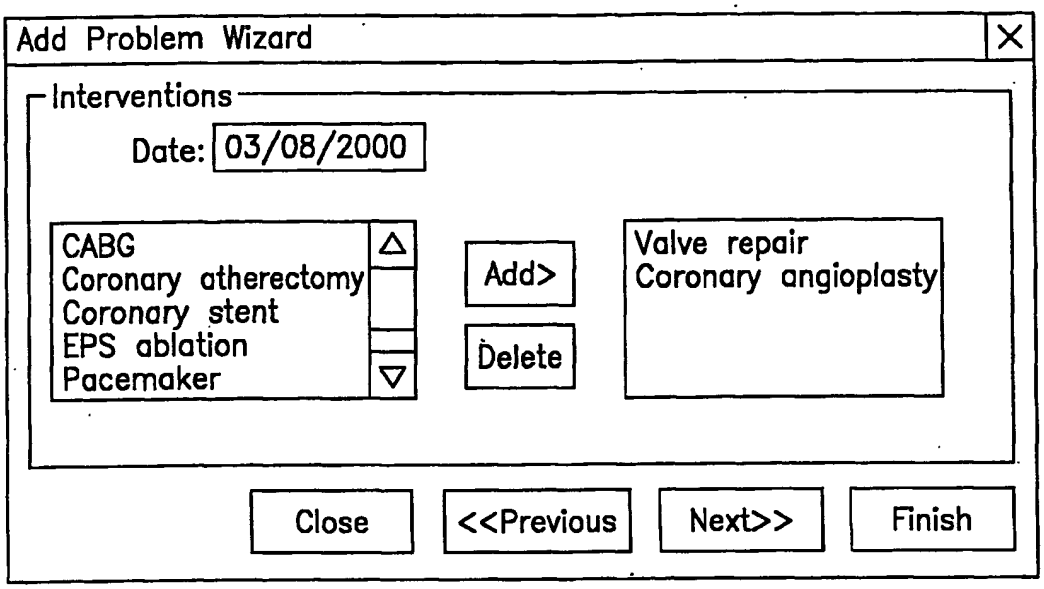

Add Problem Wizard
Interventions
Date: 03/08/2000
CABG
Coronary atherectomy
Coronary stent
EPS ablation
Pacemaker
Add>
Delete
Valve repair
Coronary angioplasty
Close
<<Previous
Next>>
Finish

FIG-40

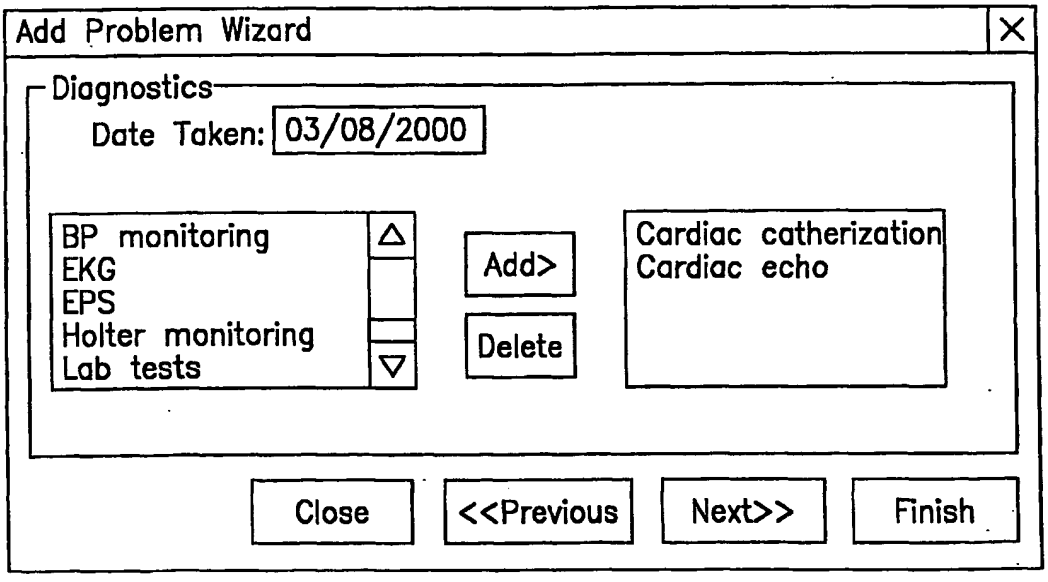

Add Problem Wizard
Diagnostics
Date Taken: 03/08/2000
BP monitoring
EKG
EPS
Holter monitoring
Lab tests
Add>
Delete
Cardiac catherization
Cardiac echo
Close
<<Previous
Next>>
Finish

FIG-41

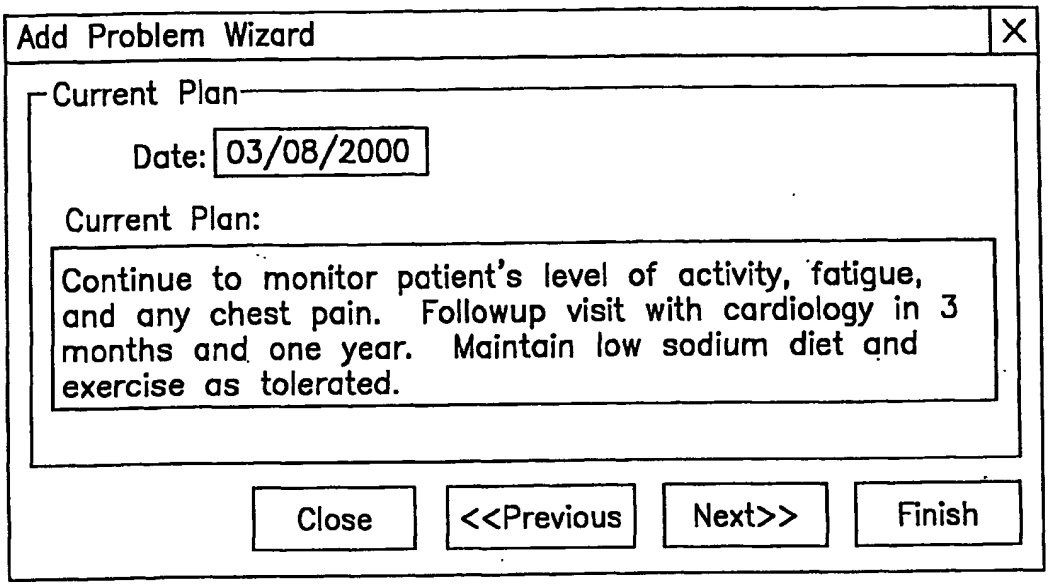

Add Problem Wizard
Current Plan
Date: 03/08/2000
Current Plan:
Continue to monitor patient's level of activity, fatigue, and any chest pain. Followup visit with cardiology in 3 months and one year. Maintain low sodium diet and exercise as tolerated.
Close
<<Previous
Next>>
Finish

FIG-42

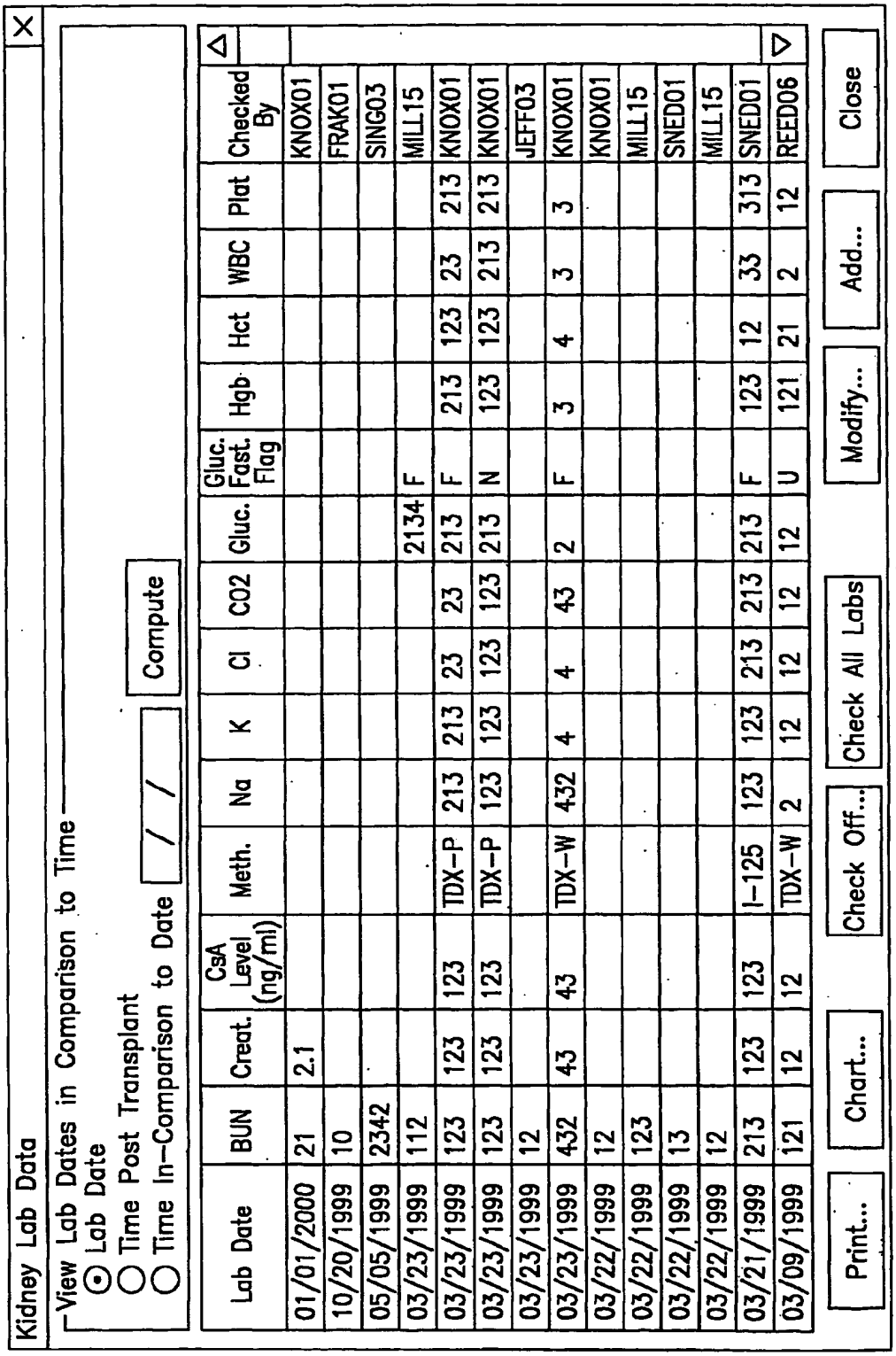

Kidney Lab Data
View Lab Dates in Comparison to Time
Lab Date
Time Post Transplant
Time In-Comparison to Date
/ /
Compute
Lab Date
BUN
Creat.
CsA Level (ng/ml)
Meth.
Na
K
Cl
CO2
Gluc.
Gluc. Fast. Flag
Hgb
Hct
WBC
Plat
Checked By
01/01/2000 21 2.1 KNOX01
10/20/1999 10 FRAK01
05/05/1999 2342 SING03
03/23/1999 112 2134 F MILL15
03/23/1999 123 123 TDX-P 213 213 23 213 F 213 123 23 213 KNOX01
03/23/1999 123 123 TDX-P 123 123 123 213 N 123 123 213 213 KNOX01
03/23/1999 12 JEFF03
03/23/1999 432 43 43 TDX-W 432 4 4 43 2 F 3 4 3 3 KNOX01
03/22/1999 12 KNOX01
03/22/1999 123 MILL15
03/22/1999 13 SNED01
03/22/1999 12 MILL15
03/21/1999 213 123 123 I-125 123 123 213 213 213 F 123 12 33 313 SNED01
03/09/1999 121 12 12 TDX-W 2 12 12 12 12 U 121 21 2 12 REED06
Print...
Chart...
Check Off...
Check All Labs
Modify...
Add...
Close

FIG-43

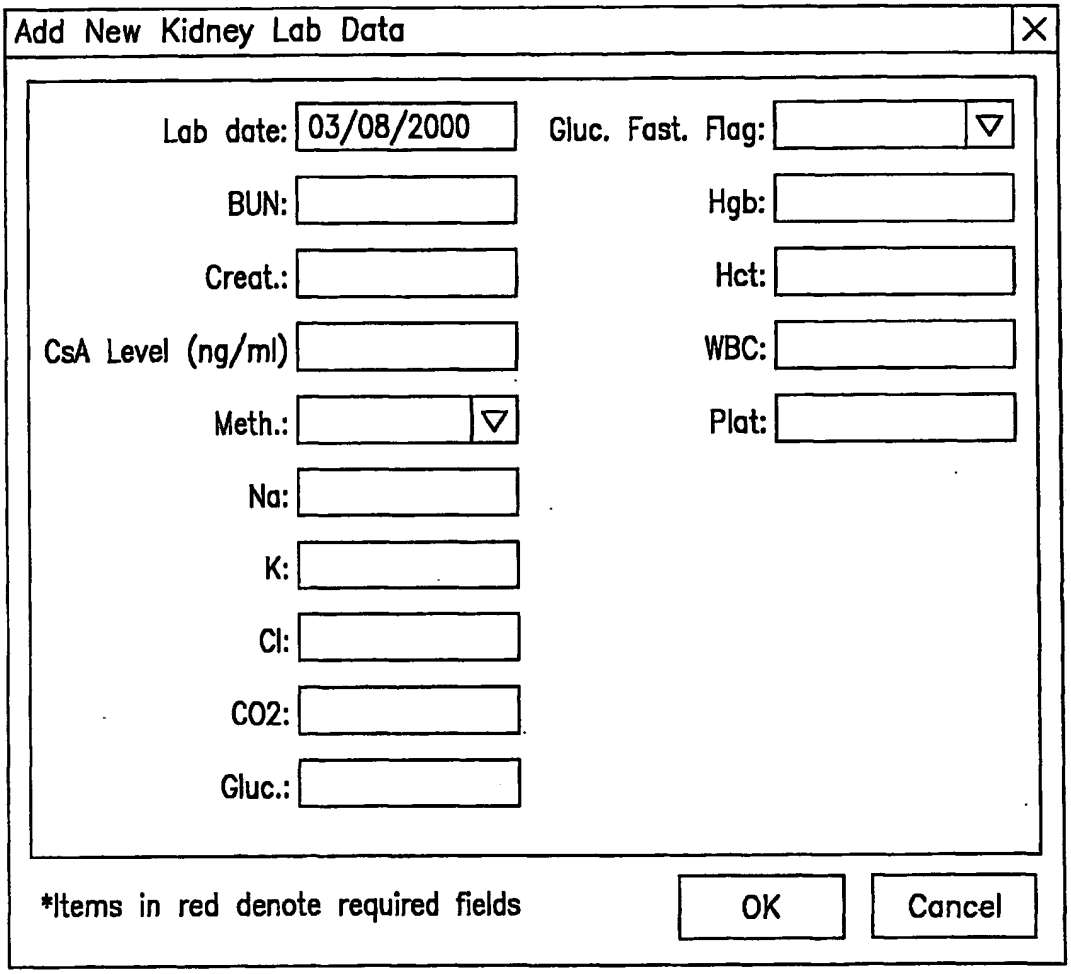

Add New Kidney Lab Data
Lab date: 03/08/2000
Gluc. Fast. Flag:
BUN:
Hgb:
Creat.:
Hct:
CsA Level (ng/ml)
WBC:
Meth.:
Plat:
Na:
K:
Cl:
CO2:
Gluc.:
*Items in red denote required fields
OK
Cancel

FIG-44

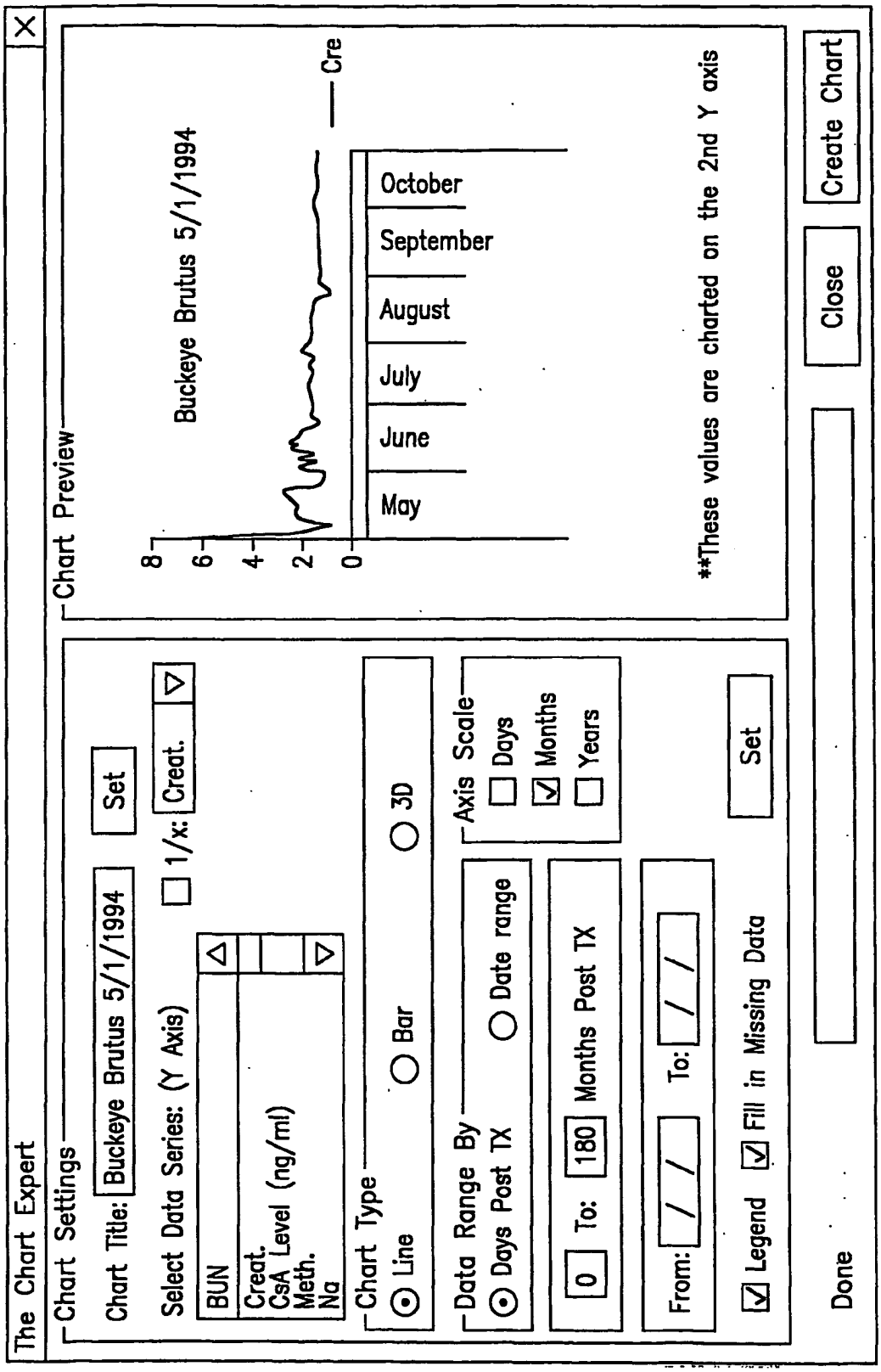

The Chart Expert
Chart Settings
Chart Title: Buckeye Brutus 5/1/1994
Set
Select Data Series: (Y Axis)
1/x: Creat.
BUN
Creat.
CsA Level (ng/ml)
Meth.
Na
Chart Type
Line
Bar
3D
Data Range By
Days Post TX
Date range
0 To: 180 Months Post TX
From: / / To: / /
Legend
Fill in Missing Data
Set
Axis Scale
Days
Months
Years
Done
Chart Preview
Buckeye Brutus 5/1/1994
Cre
October
September
August
July
June
May
8
6
4
2
0
**These values are charted on the 2nd Y axis
Close
Create Chart

FIG-45

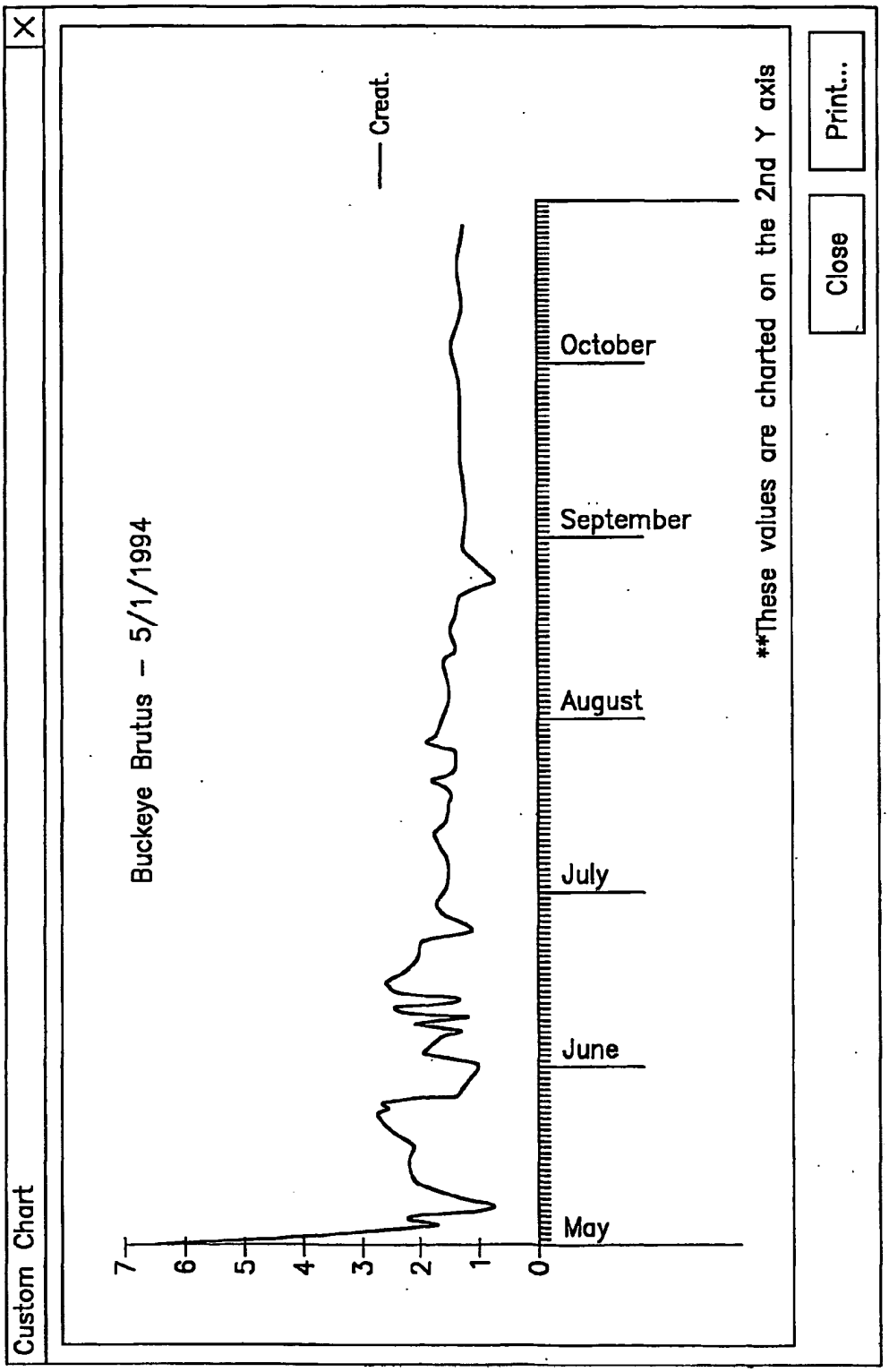

Custom Chart
Buckeye Brutus - 5/1/1994
Creat.
**These values are charted on the 2nd Y axis
Close
Print...
May
June
July
August
September
October
0
1
2
3
4
5
6
7

FIG-46